FISHERY DATA SERIES NO. 114

HARVEST ESTIMATES FOR SELECTED SPORT FISHERIES IN SOUTHEAST ALASKA IN 1988¹

Ву

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ABSTRACT

Creel surveys of major marine boat and selected roadside recreational fisheries in southeast Alaska were conducted during 1988. In the marine fisheries, dockside interviews of boat parties completing trips were used to estimate effort for and harvest of Pacific salmon and trout Oncorhynchus species, Pacific halibut Hippoglossus stenolepis, rockfish Sebastes species, and Dolly Varden Salvelinus malma. Effort and harvest estimates for roadside sport fisheries were obtained through either completed trip expansion or count type creel survey designs. Angler interviews provided harvest rate estimates for selected species. The contributions of hatchery chinook salmon Oncorhynchus tshawytscha and coho salmon Oncorhynchus kisutch to the recreational fisheries were estimated from coded-wire tag recovery Scale samples and lengths were taken from chinook salmon information. caught by marine recreational anglers for age and size composition estimates. Lengths of Pacific halibut Hippoglossus stenolepis were taken to estimate total round weight of the Pacific halibut harvest from existing length-weight relationships.

Approximately 18,100 chinook salmon, 18,200 coho salmon, 17,500 pink salmon Oncorhynchus gorbuscha, 28,300 Pacific halibut, and 21,100 rockfish were harvested in the marine boat fisheries surveyed. Harvests of coho salmon and Pacific halibut were below average in the sampled marine fisheries while harvests of chinook salmon were generally above average except in the Haines area where harvests were well below average. About 28% of the chinook salmon and 4% of the coho salmon harvested in the marine boat fisheries were of hatchery origin. In the roadside fisheries surveyed, an estimated 834 chinook salmon, 7,036 coho salmon at least 16" in length, and 1,791 sockeye salmon were taken.

KEY WORDS:

Creel survey, angler effort and harvest, harvest per unit effort, age composition, length at age estimation, round weight, recreational fishery, derby, hatchery, enhancement, coded-wire tag, chinook salmon, Oncorhynchus tshawytscha, coho salmon, Oncorhynchus kisutch, pink salmon, Oncorhynchus gorbuscha, Pacific halibut, Hippoglossus stenolepis, Dolly Varden, Salvelinus malma, rockfish, Sebastes, steelhead, Oncorhynchus mykiss, Juneau, Ketchikan, Petersburg, Wrangell, Haines, Sitka, Yakutat, southeast Alaska.

INTRODUCTION

The waters of southeast Alaska support important commercial, sport, personal use, and subsistence fisheries for a variety of salmonid, bottomfish, and shellfish species. The largest sport fishery in southeast Alaska is the Juneau marine boat fishery but other important marine boat fisheries occur around Ketchikan, Petersburg, Wrangell, Haines, and Sitka (Figure 1). In addition, there are many important roadside sport fisheries in southeast Alaska, including those in the Situk River near Yakutat and the Chilkat and Chilkoot rivers near Haines.

Creel survey information from the marine sport fisheries is used for a variety of management and reporting purposes. The U.S./Canada Pacific Salmon Treaty requires careful monitoring of commercial and recreational harvests of chinook salmon *Oncorhynchus tshawytscha*. In-season and post-season estimates of the harvests of wild and hatchery chinook salmon by marine sport fisheries in southeast Alaska are needed to monitor Alaska's compliance with catch limits established by the Treaty. Monitoring of the marine fisheries is also needed to evaluate hatchery contributions to the coho salmon *Oncorhynchus kisutch* harvest.

Harvest rate data for coho salmon in marine boat recreational fisheries, along with harvest rate data from commercial troll and net fisheries, are used to monitor the relative abundance and migratory patterns of coho salmon into inside waters. Pacific halibut *Hippoglossus stenolepis* harvest information is provided to the International Pacific Halibut Commission (IPHC) during their consideration of proposed modifications to sport fishing regulations.

Although much of the recreational sport fishing effort in southeast Alaska is from boats in saltwater, important fisheries are also accessed from roads adjacent to Southeast communities. Most of these fisheries are in freshwater, although saltwater shorelines can also support major fisheries at creek mouths or along productive beaches. Many of the sport fisheries are so dispersed as to provide little chance of over harvesting specific fish stocks.

In some more accessible locations, however, there is more potential for over harvest. About 33% of the freshwater sport fishing effort in southeast Alaska occurred in the Haines-Skagway area in 1987 (Mills 1988). Anglers fishing in the Chilkat and Chilkoot river and lake systems near Haines contributed most of this effort. Sport fishing effort on these two systems has doubled since 1981 as increased tourism has led to heavy use by non-resident anglers.

In the Yakutat area, a similar situation has occurred as recreational fisheries based on wild stocks of salmonids in the Situk River and other systems have grown to national significance. Stocks of chinook salmon in the Situk River, although currently depressed in number, are prized by anglers. The spring sport fishery for steelhead *Oncorhynchus mykiss* in the Situk River is the largest in northern southeast Alaska. In addition, in both the Haines and Yakutat areas, commercial fishing pressure on sockeye and coho salmon returning to the same systems used by sport anglers has intensified. By close monitoring through creel surveys, it is believed that the need for regulatory action can be recognized and, if necessary, in-

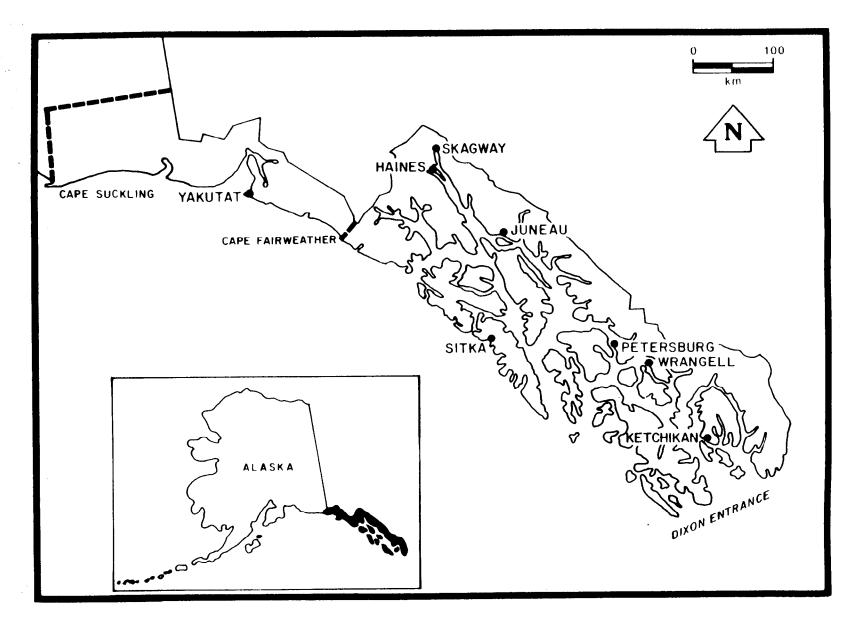


Figure 1. Communities in southeast Alaska where sport fish creel surveys are conducted.

season or post-season action can be taken to preserve these fish stocks. Creel survey information on these fisheries is also provided by management personnel to the Alaska Board of Fisheries during their consideration of proposed changes to sport fishing regulations.

Enhancement efforts designed to benefit both commercial fisheries and marine boat sport fisheries may also produce benefits for shore based anglers. In southeast Alaska, chinook and coho salmon returning to hatcheries have generated sport fisheries where none existed before. These fisheries are often small and special regulations are needed to properly manage the number of people crowded into the limited area of the fishery. The angling opportunities available at these sites are often otherwise scarce in the region and so evaluation of the harvest and other attributes of the fishery is important.

Hatchery chinook salmon releases from the Crystal Lake hatchery have produced runs of salmon which return to Crystal Creek in Blind Slough near Petersburg. Because returns have exceeded brood stock needs, sport fisheries have developed at this area. Additionally, remote releases of chinook and coho salmon at sites on the Juneau roadside have been designed to enhance angling opportunities for the large number of roadside anglers. Creel surveys are conducted to better manage the fisheries and to document benefits of the releases to sport anglers.

This report presents the findings of various recreational harvest surveys conducted throughout southeast Alaska by the Division of Sport Fish of the Alaska Department of Fish and Game (ADF&G). Harvest surveys of marine boat recreational fisheries in the Ketchikan, Petersburg, Wrangell, Sitka, Juneau, and Haines areas were conducted in 1988. Results from harvest surveys associated with a variety of roadside marine and freshwater sport fisheries in the Juneau, Haines, and Yakutat areas are also presented. Additional results from a roadside survey of the chinook salmon fishery located in Blind Slough near Petersburg on a hatchery produced run are also presented.

OBJECTIVES

Marine Boat Fisheries

The specific objectives for the 1988 marine boat harvest surveys were:

1. To estimate the total sport angler effort, catch, and harvest of Pacific salmon, Pacific halibut, rockfish Sebastes spp., trout, Dolly Varden Salvelinus malma, and lingcod Ophiodon elongatus in the following marine boat sport fisheries during the listed time periods:

<u>Fishery</u>	<u>Time Period</u>
Juneau	11 April - 25 September 1988
Ketchikan	11 April - 25 September 1988
Sitka	11 April - 25 September 1988
Petersburg	11 April - 17 July 1988

Wrangell 11 April - 17 July 1988 Haines 11 April - 10 July 1988

- 2. To estimate the contribution of hatchery chinook and coho salmon by coded-wire tag lot for the fisheries and time periods listed in Objective 1.
- 3. To estimate biweekly harvest rates for coho salmon in the Juneau, Ketchikan, and Sitka fisheries for the time periods listed above.
- 4. To estimate the age composition and mean length-at-age of the chinook salmon harvest for the fisheries and time periods listed in Objective 1.
- 5. To estimate the total round weight of Pacific halibut harvested for the fisheries and time periods listed in Objective 1.
- 6. To estimate the major species composition of the rockfish harvest in the Ketchikan and Sitka fisheries for the time periods listed in Objective 1.
- 7. To estimate the personal use and subsistence effort and harvest of dungeness crab *Cancer magister*, tanner crab *Chionoecetes* spp. and king crab *Paralithodes* spp. landed during the fisheries and time periods listed above.

Roadside Fisheries

The specific objectives for the 1988 roadside harvest surveys were:

Juneau Area:

- 1. To estimate the total angler effort and harvest of hatchery produced chinook salmon by coded-wire tag lot in terminal harvest areas at the mouths of Auke and Sheep creeks and in Montana and Fish creeks from 20 June to 14 August 1988.
- 2. To estimate the total angler effort and harvest of hatchery produced coho salmon by coded-wire tag lot in terminal harvest areas at Sheep Creek, Fish Creek, Salmon Creek, and Dredge Lakes from 12 September to 6 November 1988.
- 3. To estimate the total angler effort and harvest of stocked coho salmon in Twin Lakes from 9 May to 23 October 1988.

Petersburg Area:

 To estimate the total angler effort and harvest of hatchery chinook salmon at the Blind Slough terminal harvest area from 13 June to 14 August 1988.

Haines Area:

1. To estimate the total angler effort and total harvest of sockeye

- salmon in the Chilkoot River from 18 July to 28 August 1988.
- 2. To estimate the total angler effort and total harvest of coho salmon in the Chilkoot and Chilkat rivers from 29 August to 6 November 1988.

Yakutat Area:

- 1. To estimate the total angler effort and total harvest of steelhead in the Situk River from 28 March to 19 June 1988.
- 2. To estimate the total angler effort and total harvest of chinook salmon in the Situk River from 20 June to 17 July 1988.
- 3. To estimate the total angler effort and total harvest of coho salmon in the Situk River, Lost River, and Ankau Lagoon from 15 August to 9 October 1988.

METHODS

Marine Boat Fisheries

Study Design:

Six separate creel surveys of marine boat recreational fisheries were conducted in southeast Alaska in 1988. Site descriptions and maps of the Juneau, Ketchikan, Sitka, Petersburg, Wrangell, and Haines fisheries can be found in Bingham et al. (1988). The bag limit for chinook salmon within the fisheries was 2 per day, 2 in possession with a 28" size limit. salmon less than 28" which were tagged or missing an adipose fin could also be kept and did not count toward the daily bag limit. In the Haines area, additional special regulations designed to limit the sport harvest of chinook salmon were in effect (Appendix A). The bag limit for salmon species other than chinook salmon was 6 per day, 12 in possession for fish 16" or more in length. The Pacific halibut bag limit was 2 per day, 4 in possession, while there was no rockfish bag limit except in Sitka Sound where an 8 rockfish bag and possession limit was in effect. Personal use and subsistence regulations limited the bag/possession limit for king crab to 6 males with a 7.0" minimum size limit and a closed season from 1 April through 30 June. The take of Dungeness crab was limited by a bag/possession limit of 20 males with a size limit of 6.5" and no closed season. Subsistence regulations limited the take of tanner crabs to 30 per day and in possession with no size limit or closed season, while personal use regulations for tanner crab differed in that only males could be taken.

The primary sampling design used for the marine boat surveys was a modified direct expansion creel survey. This design is based on sampling major access points into the fishery to interview boat parties that had completed fishing trips. The estimates obtained from these surveys represent the effort and harvest by boat-parties that returned to the sampled access locations and may not represent the entire fishery as a few boats return to unsampled private moorages, docks, or unimproved access points. Additional

boats may also return at times when the harbors are not sampled (i.e. the middle of the night). In all instances, at least 90% of the fishery was thought to be sampled.

During the surveys, interviews of boat-parties provided effort, harvest, and harvest rate information. Effort and harvest information was recorded only for boat-parties and not for individual anglers. Efforts and harvests by all boat-parties interviewed during the sample periods were then expanded to include periods of time and access locations which were not sampled.

Harvest estimates were made for seasonal time periods of two weeks in length. These biweekly periods were standardized as follows (some surveys were conducted only for a portion of the season):

- 1. 11 24 April
- 2. 25 April 8 May
- 3. 9 22 May
- 4. 23 May 5 June
- 5. 6 19 June
- 6. 20 June 3 July
- 7. 4 17 July
- 8. 18 31 July
- 9. 1 14 August
- 10. 15 28 August
- 11. 29 August 11 September
- 12. 12 25 September

In the Haines area, harvest estimates were made weekly (Monday through Sunday) during the period from 9 May to 12 June. Estimates were made weekly during this time period so that the chinook salmon harvest could be monitored very closely. Also in some communities, major salmon derby harvests were estimated separately from the biweekly time period structure.

In general, each marine fishery was stratified for sampling within each biweek according to the following set of heirarchical criteria:

- 1. Type of fishing day:
 - a. weekday (Monday-Friday);
 - b. weekend-holiday (Saturday, Sunday, and legal holidays including Canadian holidays in the Haines area)
- 2. Time of day:
 - a. early day (defined as starting at 0600 and ending mid-way to the end of civil twilight); and
 - b. late day (starting mid-way between 0600 and civil twilight and ending at the end of civil twilight).
- Access type:
 - a. heavy use: harbors and boat ramps receiving a relatively "large" amount of angler effort and harvest;
 - b. low use: harbors and boat ramps receiving a relatively "small" amount of angler effort and harvest.

Samples were then allocated to these strata according to the following

general scheme:

- Within any week (i.e., Monday-Sunday), all weekend-holidays were selected for sampling.
- 2. Two contiguous weekdays were randomly selected for "non-sampling", in order to assure two days off for staff. All remaining weekdays were sampled.
- 3. Either an early or late time-of-day stratum was sampled each man-day. The time-of-day stratum was further subdivided into two sampling periods except in Ketchikan, where the time-of-day stratum was not further subdivided. The two periods included all the time during each time-of-day stratum, except for the time necessary to travel between sampling locations. During each selected time-of-day stratum, both of the two periods were sampled.
- 5. Samples were allocated to access-type strata to provide both minimal variance and minimal travel costs using sample information from 1987 surveys according to the optimal allocation procedures outlined in Cochran (1977). A minimum sample size of two was allocated for each unique stratum during each biweek.
- 6. Within each of the sampling periods in an access-type stratum, one of the possible access points was selected at random for sampling. The number of hours sampled during a day was further constrained to reduce personnel costs by minimizing overtime by randomly selecting start times within a sampling period and standardizing the time sampled to about 7.25 hours.

Specific details of sampling stratifications and allocations for each of the \sin fisheries surveyed are found in Appendix A.

A count type creel survey (Neuhold and Lu 1957) was used during major salmon derbies in Juneau, Ketchikan, Sitka, Petersburg, and Haines:

<u>Derby Location</u>	<u>Dates</u>
Juneau Golden North Salmon Derby	5-7 August 1988
Ketchikan King Salmon Derby	28-30 May, 4-5 and 11-12 June 1988
Sitka Salmon Derby	28-30 May, 4-5 June 1988
Petersburg King Salmon Derby	27-30 May 1988
Haines King Salmon Derby	28-30 May, 4-5 June 1988

This count type design works better in these intense fisheries than the direct expansion surveys due to manpower constraints. Aerial boat counts during derby time periods provided angler effort information. These aerial counts of boats were considered to be instantaneous (aerial surveys took approximately 0.75 to 1.5 hours) and reflect fishing effort at the time of the count. Two times for aerial counts per derby day were randomly selected during derby hours. Effort in boat-hours was estimated by multiplying the average boat count by the number of hours available for fishing in the time periods associated with the counts. The harvest per unit effort (HPUE) expressed in harvest per boat-hour for each species of fish was estimated from interviews of boat-parties that had completed their fishing trips. The estimated harvest was obtained from the product of the effort and HPUE

estimates.

In addition to these surveys, two sport fishing lodges on Shelter Island located near Juneau and owned by Alaska Connection were contacted. The manager of the lodges agreed to voluntarily keep track of the sport harvests of boats fishing from the lodges and to collect heads from adipose clipped chinook and coho salmon. Since this fishing effort could not be easily monitored with normal creel surveys, the information proved very valuable. Shelter Island Lodge harvests were grouped with the rest of the Juneau sport fishery as the lodge boats primarily fished areas used by other Juneau marine anglers.

Data Collection:

The following information was recorded for each boat-party interviewed:

- 1. the number of rods fished;
- 2. the number of hours fished;
- 3. the general area fished (hours fished were recorded separately if different areas were fished);
- 4. whether the fishing trip was a charter (i.e., if the angler hired a licensed operator) or if it was a personal boat trip;
- 5. whether they were fishing for salmon, halibut, rockfish, lingcod, or were personal use/subsistence crabbing (effort and catch were recorded separately if different targets were fished); and
- 6. the number of each fish species that were caught and kept, and the number that were caught and released (only crab kept were recorded).

Harvested chinook and coho salmon were checked for adipose fin clips, chinook salmon were measured to the nearest 5 mm (fork length) and scale samples taken, and harvested Pacific halibut were measured to the nearest 5 mm (total length).

Harvest Estimate Data Analysis:

During the modified direct expansion surveys, angler effort was estimated in boat-hours according to equations 1-15 (Appendix B). Similarly, effort for boats engaging in shellfish harvest activities was calculated in terms of boat-days. In addition to estimating finfish effort in terms of boat-hours, effort was also expressed in terms of angler-hours (also referred to as rod-hours). Angler-hours were obtained by multiplying the boat-hours fished by the number of rods fished from the boat. Targeted effort was estimated as the number of angler-hours fished for either salmon or bottomfish (halibut, lingcod, or rockfish). Catch and harvest were estimated similarly by substituting the corresponding statistics in place of the effort statistics into these equations. Harvest per unit effort (HPUE) in terms of fish harvested per angler-hour for both targeted and non-targeted effort was estimated according to equations 16-27 (Appendix B).

For the count type creel survey used during the derbies, a stratified random estimator was used to estimate effort in boat-hours. The average boat count

for each weekend of each derby was multiplied by the total number of available fishing hours within each derby weekend. The effort, catch, harvest, and HPUE estimates and the associated variance estimates were obtained according to equations 28-43 in Appendix B.

For both types of surveys (count and modified direct expansion) the final step in estimating the effort or harvest for the entire season or for unique combinations of individual sampling strata involved combining the stratum estimates according to equations 44-45 (Appendix B). Approximate 95% confidence intervals (CI) were obtained for harvest and effort estimates from both direct expansion and count type surveys by assuming normality according to equation 45 (Appendix B).

Harvest and catch statistics for chinook salmon caught in marine fisheries are reported separately for fish which are less than the legal size limit (28 inches or approximately 71 cm total length). Small chinook salmon could be legally harvested if they had an adipose fin clip, indicating the presence of a coded-wire tag. In this report chinook salmon less than 28 inches (71 cm) will be referred to as small chinook salmon. Fish 28 inches (71 cm) or larger will be referred to as large chinook salmon.

Contributions of Coded-Wire Tagged Stocks:

Adipose-clipped chinook and coho salmon sampled were measured to the nearest 5 mm (tip of snout to fork of tail) and their heads retained. A locking plastic strap with a unique number was inserted through the jaw. Heads and coded-wire tag (CWT) recovery data were sent to the ADF&G CWT Processing Laboratory in Juneau for tag removal and decoding.

Heads were classified as random (randomly sampled during regularly scheduled creel sampling periods) or select (voluntarily turned in by unsampled anglers). Only random recoveries were used to estimate CWT contributions. The contribution of large chinook and coho salmon with a particular tag code to the marine fisheries was estimated using procedures similar to those outlined in Clark and Bernard (1987). Their methods were modified to expand recoveries of small chinook salmon since only tagged, small chinook salmon could be legally retained while untagged, small fish from the same release could not be kept. Therefore, small chinook salmon recoveries were only expanded by the fraction of chinook salmon sampled for adipose-clips and not by the tagged to untagged ratio. Variances of tag code contributions were calculated similarly to Clark and Bernard (1987) as modified by Conrad and Larson (1987).

Chinook Salmon Age Composition and Mean Length at Age:

Tip of snout to fork-of-tail lengths of chinook salmon to the nearest 5 mm, were obtained for estimating size composition of the marine sport harvest. Additionally, several scales were removed from the third row above the lateral line in an area on a diagonal from the insertion of the dorsal fin to the origin of the anal fin. Age composition of the sport chinook salmon harvest was then estimated from analysis of the scales. Standard statistical procedures were followed in estimating mean length at age, age composition, and their variances.

Pacific Halibut Size and Weight Composition:

Pacific halibut total lengths were measured on most of the sampled sport harvest. Each individual length was converted to a round weight using procedures outlined in Quinn et al. (1983). A mean round weight was calculated from these estimates, and then multiplied by the estimated harvest to estimate total round weight of the harvest.

Roadside Fisheries

Study Design:

Study designs for estimating angler effort and harvest for the various roadside harvest surveys were similar to those used for the marine boat harvest surveys. The count type of creel survey was used for the Juneau and Haines area roadside recreational harvest surveys and for the Ankau lagoon survey on the Yakutat roadside. Direct expansion access point type surveys were used to estimate angler effort and harvest for the other Yakutat roadside fisheries and for the Blind Slough fishery. Harvest estimates for the roadside fisheries were made for the same biweekly periods as for the marine fisheries, except for Blind Slough where weekly estimates were calculated. Specific details of study designs unique to each roadside survey are detailed in Appendix A.

Regulations for the roadside fisheries varied somewhat from the boat fisheries. In Yakutat freshwater systems, the bag/possession limit for chinook salmon 16" or more in length was 2, while up to 10 fish less than 16" could be taken. In Juneau and Yakutat freshwater systems and in the Chilkoot River near Haines, a bag/possession limit of 2 coho salmon 16" or more in length was in effect. The take of Dolly Varden in freshwater on the Juneau roadside was restricted to 2 per day, 2 in possession while in saltwater and in other freshwater systems, the bag/possession limit was 10.

For all count type surveys, angler counts were taken either before or after the interviews on a random basis. Individual anglers were interviewed for the roadside surveys in contrast with the marine surveys where boat parties were interviewed.

Data Collection:

Information collected for each angler interviewed included the number of hours fished, whether the trip was complete or incomplete, and the number of each fish species that were caught and released. An instantaneous count of the number of anglers fishing a given area was also recorded.

Harvest Estimate Data Analysis:

Data analysis procedures for both count and direct expansion access type surveys were equivalent to those used for the marine harvest surveys (see Appendix B for estimation formulas). However, the individual angler rather than the boat-party was the unit for count and interview sampling.

Biological Information:

Very little biological information on fish harvested was collected during the roadside surveys. In the Juneau roadside survey, sea run coho salmon harvested were checked for adipose clips and heads were collected if the adipose fin was missing.

RESULTS

Marine Boat Fisheries

Detailed tables presenting effort and finfish harvests of the sampled marine boat fisheries can be found in the appendix for the following fisheries: Ketchikan (Appendix Tables 1 and 2), Petersburg (Appendix Tables 3 and 4), Wrangell (Appendix Tables 5 and 6), Sitka (Appendix Tables 7 and 8), Juneau (Appendix Tables 9 and 10), and Haines (Appendix Tables 11 and 12). Only a summary of the most important effort and harvest results will be presented here as the appendix tables can be consulted for much more detailed information.

Angler Effort:

The Juneau and Ketchikan boat fisheries are the largest fisheries within the region (Table 1). Although the Petersburg, Wrangell, and Haines surveys were discontinued in July, fisheries for salmon and halibut do continue at low levels after this time. About 72% of the angler effort in the sampled marine fisheries targeted on salmon. Pacific halibut were the second most important target while effort targeted on rockfish and lingcod was very minor. Major salmon derbies in all of the communities increased the amount of effort targeted on salmon substantially, as between 17% and 27% of the total fishing effort occurred during the monitored events. In Wrangell, no separate estimate of derby effort was made, but it is probably within this range for this fishery also. The estimated angler-hours of effort expended during the three days of the Golden North Salmon Derby in Juneau was greater than the total angler-hours of effort surveyed in either the Petersburg, Wrangell, Sitka, or Haines fisheries.

Chinook Salmon Fisheries:

Chinook salmon is the species of salmon most desired by sport anglers and an estimated 18,064 were harvested in the sampled marine fisheries (Table 2). About 61% of the chinook salmon taken in the marine boat fisheries were taken by Juneau (5,683) and Ketchikan (5,245) anglers. Derbies in the marine fisheries bolstered the chinook salmon harvest considerably as about 19% of the harvest occurred during the 5 monitored derbies. Although not specifically monitored, harvest of chinook salmon during the 17 day Wrangell Salmon Derby probably exceeded 700 fish. In the Ketchikan King Salmon Derby, harvest of chinook salmon during the 7 day event totaled about 31% of the entire season's harvest of chinook salmon.

Table 1. Summary of estimated angler effort by target species for sampled marine sport fisheries of southeast Alaska during 1988.

					ngler-Kou	rs by Targ	et		Total 1
Sport		Boat-	Salm	on- Ha	libut-	Ling Cod	- Rock	fish-	Angler-
Fishery	Time Period	Hours	Hour	s ł	ours	Hours	Hou	rs	Hours
Ketchikan	4/11 - 9/25	88,779	153,	086 7	0,657	0		954	225,779
Petersburg		13,291			5,334	64		0	30,421
Wrangell	4/11 - 7/17	14,888			5,097	0		0	3 4,583
Sitka	4/11 - 9/25	23,727			7,123	271	1,	099	54,766
Juneau	4/11 - 9/25	134,271	254,		6,188	0		0	351,247
Haines	4/11 - 7/10	14,214			3,435	0		0	36,222
TOTAL		289,170	530,	206 19	7,834	335	2,	053	733,018
Major Salmo (Derby D	· ·		Boat- Hours	Angler-H Salmon- Hours	Bottomf	ish- A	otal ¹ ngler- ours		entage of l Fishery
	(ing Salmon De 6/04-05, 6/11	•	19,096	39,024	6,83	0 4	5,887		20%
Petersburg (5/27-5/30	King Salmon Do	erby	3,271	7,473	198	8	7,671		25%
Sitka Salmo (5/28-30,	•		6,051	14,296	47	7 1	4,804		27%
Juneau Gold (8/05-07)	den North Salmo	on Derby	21,207	57,041	1,64	7 5	8,688		17%
Haines King (5/28-30,	g Salmon Derby 6/04-05)		2,190	6,101	15	5	6,115		17%
TOTAL			51,815	123,935	9,16	7 13	3,165		18%

 $^{^{\}mbox{\scriptsize 1}}$ Includes all targeted and non-targeted effort.

 $^{^{\}rm 2}$ Includes halibut-hours, ling cod-hours, and rockfish-hours combined.

³ For angler-hours only.

Table 2. Summary of estimated catches and harvests of chinook salmon in sampled marine sport fisheries of southeast Alaska during 1988.

		Chi	inook >	28"		ok <28"	Tota	
Sport Fishery	Time Period	Kept	Rel	leased	Kept	Released	Chino Harves	
Ketchikan	4/11 - 9/25	4,888	3	149	357	15,804	5,24	.5
Petersburg	4/11 - 7/17	1,905	j	40	31	574	1,93	6 .
Wrangell	4/11 - 7/17	1,535	j	84	0	195	1,53	5
Sitka	4/11 - 9/25	3,160)	43	17	1,401	3,17	7
Juneau	4/11 - 9/25	5,344	•	10	339	4,721	5,68	3
Haines	4/11 - 7/10	481		24	7	422	48	8
TOTAL		17,313	3	350	751	23,117	18,06	4
Major Salmo	•						Total Chinook	Percent
	on Derby							
Major Salmo (Derby D	on Derby) Er 					Chinook	
Major Salmo (Derby D Ketchikan K	on Derby (ates) (ing Salmon Derb) (6/04-05, 6/11-1)	(Er 	ntered	Total ¹	Entered	Total ¹	Chinook Harvested	of Fisher
Major Salmo (Derby D Ketchikan K (5/28-30,	on Derby vates) King Salmon Derby King Salmon Derby On Derby	(Er 	509	Total 1	Entered 8	Total ¹	Chinook Harvested	of Fisher
Major Salmo (Derby D Ketchikan K (5/28-30, Petersburg (5/27-5/30 Sitka Salmo (5/28-30,	on Derby vates) King Salmon Derby King Salmon Derby On Derby	(Er 	509 340	Total ¹ 1,528	Entered 8	80	Chinook Harvested 1,608 351	of Fisher 31% 18%

TOTAL

48

141

3,496

19%

2,065 3,355

¹ Includes entered and take-home harvests.

The portion of the total harvest of chinook salmon sampled for adipose clips varied from fishery to fishery, but the overall sampling fraction totaled 23% (Appendix Table 13). An estimated 28% of the total chinook salmon harvest was comprised of hatchery origin fish, although this varied greatly from fishery to fishery (Table 3). Fisheries with the highest percentages of hatchery fish were Petersburg (44%), Ketchikan (33%), and Sitka (32%). No hatchery fish were found in the Haines fishery. The majority (66%) of the chinook salmon harvest of hatchery origin was produced by southeast Alaskan hatcheries, but fish also originated in British Columbia, Oregon, Largest contributors to the marine harvest of chinook and Washington. salmon included the Neets Bay and Whitman Lake hatcheries owned by Southern Southeast Regional Aquaculture Association and the Crystal Lake and Snettisham hatcheries owned by Alaska Department of Fish and Game. Detailed contribution estimates by tag code and time period are presented in the appendix for Ketchikan (Appendix Table 14), Petersburg (Appendix Table 15), Wrangell (Appendix Table 16), Sitka (Appendix Table 17), and Juneau (Appendix Table 18). In addition to the recoveries of hatchery origin fish, two wild adipose-clipped chinook salmon were recovered in the Ketchikan fishery (Appendix Table 14).

The age composition of the chinook salmon harvest varied considerably among the surveyed fisheries (Table 4 and Appendix Table 19). In particular, the proportion of chinook salmon harvested without a freshwater annulus, which is usually indicative of non-Alaskan origin, varied substantially among the different fisheries. The Haines and Wrangell fisheries had no aged samples without a freshwater annulus, while about 79% of the chinook salmon scales sampled in Sitka lacked a freshwater annulus. Chinook salmon captured in spring fisheries in Petersburg, Wrangell, and Haines were primarily age 4ocean or 5-ocean fish, while fisheries in Ketchikan, Sitka, and Juneau are much more dependent on 3-ocean or younger fish. Age composition of the Juneau Golden North Salmon Derby chinook salmon harvest differed greatly from the rest of the Juneau fishery as the age composition of the Juneau non-derby fishery reflected catches of both spawners and feeders, while the derby harvests were almost all feeder fish. Mean length at age of sampled chinook salmon for a given age class varied somewhat among the fisheries surveyed (Appendix Table 20).

Coho Salmon Fisheries:

Harvests of coho salmon in the Juneau, Ketchikan, and Sitka marine fisheries totaled an estimated 18,158 (Table 5). As surveys of the Petersburg, Wrangell, and Haines fisheries were discontinued in mid-July, only small percentages of the coho salmon fisheries in these communities were monitored. Harvests of coho salmon in the Juneau fishery totaled about 66% of the harvest for the Juneau, Ketchikan, and Sitka fisheries combined. The only monitored derby in which coho salmon are heavily targeted is the Juneau Golden North Salmon Derby and an estimated 1,453 coho salmon were taken during this event.

Harvest rates of coho salmon for the Ketchikan, Sitka, and Juneau fisheries ranged up to 0.116 coho salmon per angler-hour of effort (Table 6). The harvest rate for coho salmon peaked in the period from 15 to 28 August in Juneau, in the period from 29 August to 11 September in Ketchikan, and in

Table 3. Estimates of the number of hatchery produced chinook salmon harvested in major marine sport fisheries of southeast Alaska during 1988. Last two rows of the table include the overall (hatchery and non-hatchery) combined chinook salmon harvest and the percent hatchery proportion.

		JUNEAU			KETCHIKAN			SITKA			WRANGELL			PETERSBURG	•	HAINES
REGION OR HATCHERY	LL 95% ¹	POINT ESTIMATE	UL 95% ² CI	LL 95% CI	POINT ESTIMATE	UL 95% CI	POINT ESTIMATE									
Oregon	3		8	2		688	6	35	78				1	2	5	
Washington British Columbia	4 32	100 127	267 221	2 3	90 27	247 82	15 21	68 857	120 1,977				1	1 179	2 514	
Non-Alaskan Total ³	38	231	423	7	342	834	37	960	2,080				6	182	517	0
Southeast Alaska																
CRYSTAL LAKE	26	124	222	1	3	9	4	19	37				304	638	972	
DEER MOUNTAIN				3	34	90	1	1								
HIDDEN FALLS	5		42										1	_	3	
LITTLE PORT WALTER	33	107	827										10	30	55	
MEDVEJIE CIF							1	8	24							
NEETS BAY	8	232	473	87	843	1,599	1	4	11	1	203	648	2	7	16	
PORT ARMSTRONG	1	2	6													
SNETTISHAM	231		465													
TAMGAS CREEK WHITMAN LAKE	1 16	64 83	194 151	8 283	46 479	84 675	5	34	71	2	21	54	1	2	5	
Alaskan Total ³	194	979	1,764	624	1,405	2,186	22	66	111	3	225	670	343	678	1,013	0
All Areas Grand Total	403	1,210	2,018	826	1,747	2,668	49	1,026	2,147	3	225	670	387	860	1,333	0
Overall Chinook Harvest	4,897	5,683	6,469	3,774	5,245	6,716	2,463	3,177	3,891	1,211	1,535	1,860	1,865	1,936	2,007	488
Percent Hatchery		22%			33%			32%			15%			44%		0%

Lower limit of the approximate 95% confidence interval.
Upper limit of the approximate 95% confidence interval.
Totals do not always equal sum of printed numbers due to truncation error.

Table 4. Summary of the age composition of chinook salmon sampled in selected marine sport fisheries of southeast Alaska during 1988.

Freshwater Age Composition

	Ag	ge 0	Ag	ge 1	
Sport	Sample		Sample		Total
Fishery	Size	Percent	Size	Percent	Sampled
Ketchikan	68	14%	416	86%	484
Petersburg	42	12%	323	88%	365
Wrangell	0	0%	146	100%	146
Sitka	298	79%	77	21%	375
Juneau Non-Derby	74	29%	182	71%	256
Juneau Derby ^l	69	45%	86	55%	155
Haines	0	0%	129	100%	129
Total	551	29%	1,359	71%	1,910

Saltwater Age Composition

	Age3	or less	Age ⁴	or more	
Sport Fishery	Sample Size	Percent	Sample Size	Percent	Total Sampled
Ketchikan	356	74%	128	26%	484
Petersburg	150	41%	215	59%	365
Wrangell	44	30%	102	70%	146
Sitka	284	76%	91	24%	375
Juneau Non-Derby	176	69%	80	31%	256
Juneau Derby ^l	146	94%	9	6%	155
Haines	31	24%	98	76%	129
Total	1,187	62%	723	38%	1,910

¹ Juneau Golden North Salmon Derby

Table 5. Summary of estimated harvests and catches of coho salmon in sampled marine sport fisheries of southeast Alaska during 1988.

Sport		Coho Salmon			
Fishery	Time Period	Wild	Hatchery	Total	Released
Ketchikan	4/11 - 9/25	5,233	292	5,525	4,386
Sitka	4/11 - 9/25	398	218	616	107
Juneau Non-Derby	4/11 - 9/25	10,307	257	10,564	201
Derby ¹	8/05 - 8/07	1,448	5	1,453 ²	36
Juneau Subtotal		11,755	262	12,017	237
TOTAL		17,386	772	18,158	4,731

¹ Juneau Golden North Salmon Derby

 $^{^{2}}$ Of the 1,453 coho salmon harvested, 1,099 were entered in the derby.

Table 6. Harvest rates for coho salmon (harvest per angler-hour of effort) by seasonal period in the Ketchikan, Sitka, and Juneau marine boat fisheries during 1988.

	Harvest of Coho Salmon per Angler-Hour of Effort ¹						
Seasonal Period	Ketchikan	Sitka	Juneau				
6/06-6/19	0.001	0.000	0.000				
6/20-7/03	0.004	0.004	0.002				
7/04-7/17	0.017	0.008	0.013				
7/18-7/31	0.009	0.002	0.030				
8/01-8/14	0.019	0.015	0.069				
8/15-8/28	0.037	0.032	0.116				
8/29-9/11	0.101	0.057	0.100				
9/12-9/25	0.051	0.085	0.024				

 $^{^{\}scriptsize 1}$ Does not include derby effort

the period from 12 September to 25 September in Sitka.

Only 2% of the harvest of coho salmon in the Juneau fishery was of hatchery origin while 35% of the Sitka harvest was of hatchery origin (Table 7). All of the hatchery coho salmon were produced by southeast Alaskan hatcheries. An estimated 23% of the coho salmon harvest of the monitored fisheries was checked for adipose clips (Appendix Table 21). Estimates of coho salmon hatchery contributions by tag code and time period are presented in the appendix for the Ketchikan, Sitka, and Juneau fisheries (Appendix Table 22). Additionally, some recoveries of coho salmon from wild stocks were obtained (Appendix Table 23), but as tagging fractions were unknown, total contributions of these wild-tagged stocks could not be estimated.

Bottomfish Fisheries

Most of the bottomfish effort in southeast Alaska is targeted on Pacific halibut and an estimated 28,277 were taken in the sampled marine fisheries (Table 8). A relatively large amount of Pacific halibut harvest in addition to that listed takes place in the Wrangell, Petersburg, and Haines fisheries after the survey period ended. Estimated average size of the halibut harvested did not vary greatly between communities except in Haines where the sample size was very small (Table 9). The total round weight for the fisheries therefore generally reflected the numerical size of the harvest.

Although rockfish are not a primary target of most marine anglers, large numbers of rockfish were caught in the Ketchikan and Sitka marine fisheries (Table 8). Most of the rockfish harvest (83%) occurred in the Ketchikan fishery, as anglers in the Sitka fishery released 84% of the rockfish caught. This high release rate for Sitka anglers was not due to the 8 rockfish bag/possession limit in Sitka Sound, as very few anglers retained substantial numbers of rockfish. Release rates in the Ketchikan fishery were also substantial as anglers released 15,516 fish in addition to those harvested. In the other fisheries, rockfish caught were usually harvested.

Species composition of the rockfish harvest was similar for the Ketchikan and Sitka fisheries (Table 10). Quillback rockfish Sebastes maliger were most frequently found in the harvest of both areas, comprising about 47% of the combined Sitka and Ketchikan harvest. Yelloweye rockfish Sebastes ruberrimus were second most frequently taken as they composed an additional In addition to the two species mentioned, 24% of the combined harvest. sport harvests also included small numbers of black rockfish Sebastes melanops, dusky rockfish Sebastes ciliatus, copper rockfish Sebastes yellowtail flavidus, boccacio Sebastes Sebastes caurinus, rockfish Sebastes brevispinus, paucispinis, silvergray rockfish unidentified species. Lingcod and kelp greenling Hexagrammos decagrammus were also harvested in small numbers primarily in the Sitka and Ketchikan fisheries (Table 8).

Other Salmonid Fisheries:

Although not usually primary targets, other salmonids such as pink, chum, and sockeye salmon, and Dolly Varden were harvested in the monitored fisheries (Table 11). Most of the harvest of the incidental salmon species

Table 7. Estimates of the number of hatchery produced coho salmon harvested in selected marine sport fisheries of southeast Alaska during 1988. Last two rows of the table include the overall (hatchery and non-hatchery) combined coho salmon harvest and the percent hatchery proportion.

		JUNEAU		1	KETCHIKAN			SITKA	
HATCHERY	LL 95% ¹	POINT ESTIMATE	UL 95%2 CI	LL 95% CI	POINT ESTIMATE	UL 95% CI	LL 95% CI	POINT ESTIMATE	UI. 95% CI
Southeast Alaska									
AUKE CREEK	1	8	22						
MEDVEJIE CIF	1	3	8						
NAKAT INLET				1	64	192			
SHEEP CREEK	4	19	41						
SHELDON JACKSON							7	218	51:
SNETTISHAM	2	232	643						
WHITMAN LAKE				3	228	500			
Grand Total	8	262	674	4	292	591	7	218	51:
Overall Coho Harvest	10,957	12,017	13,437	3,980	5,525	7,069	382	616	85
Percent Hatchery		 2%			5%			35%	

¹ Lower limit of the approximate 95% confidence interval.

Upper limit of the approximate 95% confidence interval.

Table 8. Summary of estimated harvests of Pacific halibut, rockfish, lingcod, and kelp greenling in sampled marine sport fisheries of southeast Alaska during 1988.

Sport		Pacifi	Pacific Halibut		Rockfish		ngcod	Kelp Greenling	
Fishery	Time Period	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Ketchikan	4/11 - 9/25	7,317	1,338	17,477	15,516	932	143	67 ¹	13 ¹
Petersburg	4/11 - 7/17	602	658	38	0	27	0	6	0
Wrangell	4/11 - 7/17	542	21	65	0	0	0	0	0
Sitka	4/11 - 9/25	6,923	5,962	2,587	13,500	955	616	218	253
Juneau	4/11 - 9/25	12,672	5,027	967	193	8	0	5	0
Haines	4/11 - 7/10	221	17	6	0	0	0	6	0
TOTAL		28,277	13,023	21,140	29,209	1,922	759	302	266

 $^{^{1}}$ Kelp greenling catches in Ketchikan were only recorded through June 22.

Table 9. Average lengths, round weights, and total round weight for Pacific halibut harvested by selected marine sport fisheries of southeast Alaska during 1988.

Sport Fishery	Time Period	Sample Size	Average Length * (cm)	Average Round Wt. (lbs)	Estimated Number Harvested	Estimated Total Round Weight (thousand lbs)
Ketchikan	4/11 - 9/25	264	93.0	27.7	7,317	202.7
Petersburg	4/11 - 7/17	45	93.8	27.0	602	16.3
Wrangell	4/11 - 7/17	67	92.6	26.5	542	14.4
Sitka	4/11 - 9/25	214	92.0	23.5	6,923	162.7
Juneau	4/11 - 9/25	549	91.5	26.9	12,672	340.9
Haines	4/11 - 7/10	26	76.3	14.7	221	3.2
TOTAL		1,165	91.7	26.1	28,271	739.9

Table 10. Rockfish species composition in the Ketchikan and Sitka marine sport fisheries during 11 April to 25 September 1988. Due to time constraints, approximately 51% of the rockfish harvest in the Ketchikan area and 29% of the rockfish harvest in the Sitka area were not keyed out to species. The unidentified rockfish harvest was allocated to species by expanding the appropriate percentage of harvest in the identified harvest to the total harvest.

	Ketchikan		Si	tka	То	tal ¹
Species	Harvest	Percent	Harvest	Percent	Harvest	Percent
Black Rockfish	449	3%	327	13%	776	4%
Boccacio Rockfish			236	9%	236	1%
Copper Rockfish	778	4%	61	2%	839	4%
Dusky Rockfish	774	4%	75	3%	849	4%
Quillback Rockfish	8,305	48%	1,023	40%	9,329	46%
Silvergray Rockfish	1,117	6%			1,117	6%
Yelloweye Rockfish	4,311	25%	454	18%	4,765	24%
Yellowtail Rockfish	142	1%	59	2%	202	1%
Other Rockfish	1,601	9%	351	14%	1,952	10%
TOTAL	17,477	100%	2,587	101%	20,064	100%

The boccacio harvest in Ketchikan and the silvergray rockfish harvest in Sitka were not estimated and were therefore assumed to be 0 in these communities for purposes of computing totals.

Table 11. Summary of estimated harvests of pink salmon, chum salmon, sockeye salmon, and Dolly Varden in sampled marine sport fisheries of southeast Alaska during 1988.

Sport			Pink Salmon		Chu	m Salmon	Sockeye Salmon		Dolly Varden	
Fishery	Time	Period	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Ketchikan	4/11	- 9/25	12,339	3,475	671	31	82	47	0	0
Petersburg	4/11	- 7/17	0	0	9	0	0	0	77	8
Wrangell	4/11	- 7/17	128	231	8	0	0	0	0	0
Sitka	4/11	- 9/25	218	163	312	333	0	0	319	234
Juneau	4/11	- 9/25	4,798	1,044	1,328	74	20	0	1,509	482
Haines	4/11	- 7/10	0	0	0	0	0	0	323	100
Total			17,483	4,913	2,328	438	102	47	2,228	824

in the Petersburg, Wrangell, and Haines fisheries occurs after these surveys are over. Pink salmon are sometimes targeted by marine boat anglers, and an estimated 17,483 were taken in the monitored fisheries with the majority taken in Ketchikan (71%). Retention rates for pink salmon were fairly high (78%), as were retention rates for other incidentally harvested salmonids. Harvests of Dolly Varden were generally highest in the northern fisheries of Sitka, Juneau, and Haines.

Shellfish Fisheries:

Effort and harvests of Dungeness, tanner, and king crab were estimated for all of the marine fisheries sampled (Table 12). The highest effort in boat-days for shellfish was documented in the Juneau fishery. Some information was collected on the number of pots or rings fished, but since some effort was expended by divers, effort in boat-days is most comparable from fishery to fishery. Dungeness crab were harvested in the highest numbers by all fisheries, but tanner crabs were also harvested in relatively large numbers in the Juneau, Petersburg, and Haines fisheries. Since the subsistence or personal use taking of red and blue king crab is prohibited from 1 April through 30 June, estimated harvest of king crabs totaled only 562. Additionally, harvest of shrimp in the Ketchikan personal use fishery was estimated from 23 June to 25 September, 1988. The total harvest of shrimp during this period was estimated to be 27,643 shrimp.

Roadside Fisheries

Detailed tables presenting effort and harvests of the sampled roadside fisheries can be found in the appendix for the following areas: Blind Slough (Appendix Table 24), Juneau Roadside (Appendix Table 25), Haines Roadside (Appendix Table 26), and Yakutat Roadside (Appendix Table 27). Only the most important results will be presented here as the appendix tables can be consulted for much more detailed information.

Chinook Salmon Fisheries:

An estimated 4,917 angler-hours were expended by anglers at Blind Slough to harvest 646 chinook salmon during the period from 13 June to 14 August 1988 (Appendix Table 24). Harvests increased greatly during the week of 20 June to 26 June and remained fairly high through the week of 18 July to 24 July after which they declined. Release rates for chinook salmon were high as anglers released about 44% (515) of the chinook salmon caught.

The Situk River provides the primary freshwater opportunity for anglers fishing for chinook salmon in the Yakutat area. Harvests of chinook salmon in the Situk River were limited in 1988 by an emergency order enacted on 5 July 1988 which prohibited the retention of chinook salmon over 16" in length upstream from the Situk River weir. Also to further reduce incidental mortality of chinook salmon, an emergency regulation was enacted on 8 July which prohibited the use of salmon eggs for bait in the Situk River. An estimated 185 large chinook salmon (>16") were harvested in the Situk River for the season along with 3 jack (<16") chinook salmon (Appendix Table 27). An additional 124 large and 31 jack chinook salmon were

Table 12. Estimated effort for, and harvests of, Dungeness, king, and tanner crab and shrimp in major boat personal use and subsistence fisheries of southeast Alaska during 1988.

	APPROXIMATE 95% C.I. LOWER		APPROXIMATE 95% C.I. UPPER
	LIMIT	ESTIMATE	LIMIT
Ketchikan (4/11-9/25)			
Boat-days Fished	1,057	1,398	1,740
Dungeness Crab Kept	5,834	9,043	12,252
King Crab Kept	0	0	0
Tanner Crab Kept	0	0	0
Shrimp Kept (only from 6/23 - 9/25)	10,324	27,643	44,962
Petersburg (4/11-7/17)			
Boat-days Fished	83	171	259
Dungeness Crab Kept	287	939	1,592
King Crab Kept	0	0	0
Tanner Crab Kept	29	249	632
Shrimp Kept			
Wrangell (4/11-7/17)			
. Boat-days Fished	63	107	151
Dungeness Crab Kept	470	868	1,265
King Crab Kept	0	0	0
Tanner Crab Kept	15	60	166
Shrimp Kept			
Sitka (4/11-9/25)			
Boat-days Fished	371	635	899
Dungeness Crab Kept	874	1,642	2,409
King Crab Kept	2	10	29
Tanner Crab Kept	2	26	76
Shrimp Kept			
Juneau (4/11-9/25)			
Boat-days Fished	1,936	2,287	2,637
Dungeness Crab Kept	4,469	6,459	8,450
King Crab Kept	275	552	828
Tanner Crab Kept	1,669	3,042	4,414
Shrimp Kept			~~~
Haines (4/11-7/10)			
Boat-days Fished	108	188	267
Dungeness Crab Kept	36	257	485
King Crab Kept	0	0	0
Tanner Crab Kept	28	254	489
Shrimp Kept			

released.

Since the number and timing of hatchery chinook salmon returning to the Juneau roadside release sites was unknown, foot surveys were made beginning in mid-June to discover if chinook salmon were returning to the release sites at Auke Creek, Sheep Creek, Fish Creek, and Montana Creek. The number of returning chinook salmon was not expected to be very high as the oldest chinook salmon were only 2-ocean fish. The surveys did not discover any returning chinook salmon and the numbers of anglers seen were very small, so the creel survey was not undertaken. A few chinook salmon were caught by sport anglers but the total harvest was assumed to be less than 20, as no concentrations of fish were discovered.

Coho Salmon Fisheries:

Hatchery releases of sea-run coho salmon on the Juneau roadside during 1987 failed to generate significant sport fisheries and harvests during 1988 (Table 13). The most successful release area was the Dredge Lakes site where an estimated 464 angler-hours of effort were expended between 12 September and 23 October to harvest about 25 large (>16") and 94 jack (<16") coho salmon. Neither of the two large coho salmon sampled were adiposeclipped, and only two of the 10 jack coho salmon were adipose clipped. The one valid coded-wire tag recovery of a jack coho salmon (code 04-27-30) expanded out to a contribution of 29 fish. This random recovery and the other three select recoveries of this tag code for which lengths were available were of fish only 15 to 16 inches in length. Perhaps many of the coho planted in 1987 failed to smolt and held in Dredge Lakes for another About 119 large coho salmon were also released at Dredge Lakes season. primarily because many of the fish were very dark before they moved into the holding pond. Angler effort for and harvest of coho salmon at the Salmon, Sheep, and Fish creek release sites was very low during the survey period.

Unlike the releases of sea-run hatchery coho salmon, a hatchery release of landlocked coho salmon generated a substantial sport fishery in the Juneau area during 1988 (Table 13). Twin Lakes was stocked on 19 May 1988 with about 8,200 coho salmon. Between 9 May and 23 October, an estimated 3,398 coho salmon were harvested with another 2,646 released. Of these fish, approximately 256 coho salmon were harvested on 11 June 1988 by an estimated 228 anglers during Family Fishing Day. Average harvest rate for the entire survey period was excellent at 0.95 coho salmon harvested per angler-hour.

Wild stocks of coho salmon provided an estimated harvest of 6,115 for sport anglers in the Situk River, Lost River, and Ankau Lagoon fisheries in the Yakutat area during 1988 (Table 13). All three of these fisheries were very productive as sport anglers harvested in the range of 2,000 coho salmon in each of the three systems.

Coho salmon of wild origin were the primary targets of fall anglers in the Chilkoot and Chilkat rivers near Haines (Table 13). In comparison to the Yakutat systems, effort and harvest of coho salmon during the fall were substantially smaller. The 1988 escapement of coho salmon to the Chilkoot River was below average, and coho salmon fishing in the river above the ADF&G weir was closed by emergency order on 7 October. Total harvest in the Chilkoot River to this time totaled 381 coho salmon.

Table 13. Estimated effort, harvest, and catch of coho salmon in selected southeast Alaska roadside sport fisheries during 1988.

adside		Angler-	Large (Coho Salmon ¹	Small	Coho Salmon
shery	Time Period	Hours	Kept	Released	Kept	Released
neau Roadside						
win Lakes	5/09 - 10/23	3,587	0	0	3,398	2,646
almon Creek	9/12 - 10/23	115	0	0	0	0
eep Creek	9/12 - 10/23	105	0	0	0	0
sh Creek	9/12 - 10/23	83	0	31	0	0
edge Lake	9/12 - 10/23	464	25	119	94	7
ıneau Total		4,354	25	150	3,492	2,653
nes Roadside						
ilkat River	9/12 - 11/06	3,687	519	117	3	0
lkoot River	9/12 - 11/06	3,952	377	66	4	4
nes Total:		7,638	896	183	7	4
cutat Roadside						
nkau Lagoon	8/15 - 10/09	11,526	2,429	536	0	0
st River 2 tuk River	8/15 - 10/09	7,373	1,800	268	0	0
uk River ²	8/01 - 10/09	11,678	1,886	631	0	0
kutat Total:		30,577	6,115	1,435	0	0
ΓAL		42,569	7,036	1,768	3,499	2,657

 $^{^{1}\,}$ Large coho salmon are those 16" or greater in length while small coho salmon are less than 16" in length.

 $^{^{2}}$ Includes 9-Mile Bridge area from 8/01 to 8/14 only.

Other Salmonid Fisheries:

A spring steelhead fishery in the Situk River is a very important fishery within southeast Alaska. During the 1988 spring fishery in the Situk, anglers caught 5,414 steelhead of which 4,991 (92%) were released (Appendix Table 27). Most of the catch of steelhead occurred in April and early May.

Pink salmon, sockeye salmon, and chum salmon harvests were also important in roadside harvests in the Haines and/or Yakutat areas (Table 14). The most productive pink salmon fisheries surveyed were Chilkoot River (3,590 harvest), Lutak Inlet (1,537 harvest), and Situk River (1,212 harvest). Release rates for pink salmon were generally high in these fisheries. Sockeye salmon also support popular fisheries in the Situk (1,182 harvest) and Chilkoot (609 harvest) rivers. In contrast to the pink salmon fisheries, most sockeye caught are retained. Harvests of chum salmon were only substantial in the Chilkat River near Haines (590).

Stocks of Dolly Varden also generated substantial harvests in the Chilkoot (5,829) and Situk (1,102) rivers (Table 14). Retention rates for Dolly Varden were much higher in the Chilkoot River than in the Situk River, indicating a much higher preference for Dolly Varden by anglers fishing the Chilkoot River. Although also a popular sport fish, cutthroat *Oncorhynchus clarki* were not harvested or caught in large numbers in any of the monitored roadside fisheries.

DISCUSSION

Marine Boat Fisheries

On-site creel surveys of the Juneau marine boat sport fishery have been conducted every year since 1960 (Mattson 1975; Schmidt et al. 1973; Schmidt and Robards 1974, 1975; Robards 1976, 1977, 1978; Marriott et al. 1979; Schwan 1980, 1981, 1982; Neimark and Schwan 1983; Neimark 1984, 1985; Mecum and Suchanek 1986, 1987; and Bingham et al. 1988). Other major Southeast marine fisheries have been sampled much more sporadically, however, and it has only been since 1983 that the marine sampling program has been expanded greatly to consistently monitor areas other than the Juneau fishery.

Chinook Salmon Fisheries:

Total harvest estimates for chinook salmon for the surveyed marine boat fisheries were generally above average except in the Haines fishery which had a harvest that was only about 35% of average (Table 15). The low harvest of chinook salmon in the Haines fishery was partially due to a closed area in upper Chilkat Inlet and to a seasonal bag limit of 3 chinook salmon. In addition, the run of chinook salmon was weak and low harvest rates led to in-season management in the form of a complete closure of the chinook salmon fishery in Chilkat and Chilkoot inlets on June 13. Harvest of chinook salmon in the Juneau Golden North Salmon Derby was the lowest since 1980 (Table 15).

Table 14. Estimated effort and harvest of pink salmon, sockeye salmon, chum salmon, Dolly Varden, and cutthroat in selected southeast Alaska roadside sport fisheries during 1988.

			Pink	Salmon	Socke	ye Salmon	Chum	Salmon	Doll	y Varden	Cu	tthroat
Roadside Fishery	Time Period	Angler- Hours	Kept	Released	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Juneau Roadside												
Twin Lakes	5/09 - 10/23	3,587	0	0	0	0	0	0	5	5	55	67
Salmon Creek	9/12 - 10/23	115	143	256	0	0	0	0	0	0	0	0
Sheep Creek	9/12 - 10/23	105	0	0	0	0	0	0	0	0	0	0
Fish Creek	9/12 - 10/23	83	0	0	0	0	0	0	23	0	0	0
Dredge Lake	9/12 - 10/23	464	0	0	0	0	0	0	26	131	23	0
Juneau Total		4,354	143	256	0	0	0	0	54	136	78	67
Haines Roadside	0/49 44/0/	7 (07	•	•	0		590	578	139	53	11	0
Chilkat River	9/12 - 11/06	3,687	7 500	0	0 609	0 12		210 7			5	0
Chilkoot River	6/20 - 11/06	22,633	3,590	9,175		0	4 0	ó	5,829 48	1,605 122	10	0
Lutak Inlet	6/20 - 11/06	3,293	1,537	1,027	0	U	U	U	40	122	10	U
Haines Total:		29,613	5,127	10,202	609	12	594	585	6,016	1,780	26	0
Yakutat Roadside												
Ankau Lagoon	8/15 - 10/09	11,526	9	22	0	0	0	0	0	0	0	0
Lost River .	8/15 - 10/09	7,373	44	56	0	0	0	0	14	33	0	0
Situk River	3/28 - 10/09	30,071	1,212	2,146	1,182	404	0	0	1,102	2,007	0	0
Yakutat Total:		48,970	1,265	2,224	1,182	404	0	0	1,116	2,040	0	0
TOTAL		82,937	6,535	12,682	1,791	416	594	585	7,186	3,956	104	67

¹Includes 9 Mile bridge area from 28 March to 14 August 1988.

Table 15. Estimated harvests of chinook salmon in selected marine sport fisheries of southeast Alaska as determined by on-site creel surveys for comparable sample periods.

Year	Juneau ¹ Marine	Juneau Golden North Derby	Ketchikan Marine	Petersburg Marine	Wrangell Marine	Sitka Marine	Haines Marine
1977	4,845	516					
1978	3,020	250					
1979	4,644	1,007					
1980	5,552	477					
1981	4,165	873					
1982	4,670	1,016					
1983	4,316	872		402	1,120		
1984	6,474	855	1,820	943	1,116		1,082
1985	8,133	1,222		1,318	1,420		1,709
1986	5,050	1,073	5,006	1,070	1,812		1,655
1987	8,893	1,005	4,723	1,401	1,218	2,466	1,098
verage	5,433	833	3,850	1,027	1,337	2,466	1,386
1988	5,683	677	5,245	1,936	1,535	3,177	488
ercent of Av	/e. 105%	81%	136%	189%	115%	129%	3 5%

¹ Includes Juneau Golden North Salmon Derby Harvest

Contributions of hatchery chinook salmon to the sampled marine fisheries have increased greatly since 1983 (Table 16). Increases have been greatest in the Petersburg fishery where currently over 40% of the harvest is of hatchery origin. The chinook salmon fishery near Petersburg has benefited greatly from the nearby Crystal Lake Hatchery, and this fishery was 189% of average. A large increase in the hatchery harvest for the Sitka marine fishery during 1988 was primarily due to large harvests of chinook salmon from hatcheries in British Columbia, Washington, and Oregon.

Coho Salmon Fisheries:

Harvests of coho salmon in the Ketchikan and Juneau areas were below average (Table 17). In Ketchikan, the 1988 harvest of 5,525 was only 36% of recent year average harvests. Harvest of coho salmon in the Sitka fishery was only about 52% of that taken in 1987.

The Ketchikan coho salmon fishery was well below average in part due to a failure in returns of hatchery coho salmon to local hatcheries. These hatcheries produced an average of 29% of the coho salmon harvested by the Ketchikan marine fishery during 1984, 1986, and 1987 (Table 18). Only an estimated 5% (292) of the 5,525 coho salmon harvested in the Ketchikan fishery during 1988 were of hatchery origin. In Juneau, hatchery contributions of coho salmon have been relatively small. Since 1983, only about 3% of the Juneau harvest has been of hatchery origin.

Bottomfish Fisheries

In contrast to harvests of salmon species, Pacific halibut harvests have been relatively stable over the past few years. Harvests and catches of Pacific halibut in 1988 were below average for the period from 1983 to 1987 in the Juneau and Ketchikan fisheries (Table 19). Juneau anglers have harvested about 14,000 Pacific halibut annually while Ketchikan anglers have taken about 9,000. In Ketchikan, an average of about 85% of the Pacific halibut caught are harvested while in Juneau, the retention rate is about 70%

Rockfish harvests have been of some concern within the region because these fish are very slow growing, have limited home ranges, and are therefore susceptible to overfishing. Many fish released probably subsequently die because their air bladders can not adjust to rapid changes in air pressure. Unfortunately, information on the composition of rockfish catches has only been gathered since 1987. Data gathered through 1988 indicate that species such as yelloweye and quillback rockfish compose much of the sport harvest. These species both have limited home ranges and are slow growing. In both the Sitka and Ketchikan fisheries, retention rates for rockfish are often low, and, therefore, the actual mortality may be substantially larger than the known harvest due to mortality upon release. Several more years of data will be necessary before it becomes clear whether sport catches of rockfish are declining in the Sitka and Ketchikan areas.

Table 16. Estimated contributions of hatchery produced chinook salmon to selected marine sport fisheries of southeast Alaska as determined by on-site creel surveys.

	Juneau	Marine	Ketchikar	Marine	Sitka M	larine	Petersbur	g Marine	Wrangell	Marine	Haines	Marine
Year	Hatchery Contrib.	% of Harvest										
1983	46	1%	350	10%			23	6%	0	0%		
1984	577	9%	432	24%			140	15%	66	6%	0	0
1 9 85	1,037	13%	862	34%			371	28%	0	0%	0	0
1986	1,032	20%	2,226	44%	37	5%	290	27%	188	10%	0	0
1987	2,060	23%	1,409	30%	150	6%	670	48%	5	<1%	14	1%
Average	950	15%	1,056	30%	94	6%	299	29%	52	4%	3	<1%
1988	1,210	22%	1,747	33%	1,026	32%	860	44%	225	15%	0	0

Table 17. Estimated harvests of coho salmon in the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys for comparable sample periods.

Year	Juneau ¹ Marine	Juneau Golden North Derby	Ketchikan Marine
1977	13,084	3,625	
1978	16,697	2,855	
1979	10,150	3,224	
1980	12,641	2,277	
1981	8,661	1,764	
1982	20,747	5,320	
1983	12,662	2,964	
1984	10,100	1,594	14,231
1985	17,138	2,919	
1986	9,763	367	20,814
1987	17,610	3,056	10,464
Average	13,568	2,724	15,170
1988	12,017	1,453	5,525
Percent of Ave.	89%	53%	36%

 $^{^{1}}$ Includes Juneau Golden North Salmon Derby harvest

Table 18. Estimated contributions of hatchery produced coho salmon to the Juneau and Ketchikan marine sport fisheries as determined by onsite creel surveys.

	Juneau 1	Marine	Ketchikan	Marine
Year	Hatchery Contribution	Percent of Harvest	Hatchery Contribution	Percent of Harvest
1983	227	2%		
1984	52	1%	5,181	36%
1985	1,353	8%		
1986	37	<1%	3,200	15%
1987	94	3%	4,663	45%
Average	353	3%	4,348	29%
1988	262	2%	292	5%

Table 19. Estimated harvests and catches of Pacific halibut in the Juneau and Ketchikan marine sport fisheries, 1983-1988.

		Juneau	Marine		Ketchikan Marine						
Year	Kept	Released	Total	Percent Retained	Kept	Reteased	Total	Percent Retained			
											
1983	16,414	4,674	21,088	78%							
1984	14,609	9,100	23,709	62%	8,913	748	9,661	92%			
1985	11,931	3,955	15,886	75%							
1986	13,132	6,868	20,000	66%	8,208	1,577	9,785	84%			
1987	13,513	10,357	23,870	57%	10,493	3,390	13,883	76%			
A verage	13,920	6,991	20,911	67%	9,205	1,905	11,110	83%			
1988	12,672	5,027	17,699	72%	7,317	1,338	8,655	85%			
% of Ave.	91%	72%	85%		79%	70%	78%				

Shellfish Fisheries:

Data were collected on personal use and subsistence crab harvests in the marine fisheries for the first time during 1988. It is thought that a substantial portion of king crab harvest and perhaps harvest of other crab species occurs during the fall, winter, and early spring months when the fisheries are not monitored, but the data collected are useful in describing the widespread amount of personal use and subsistence effort for crab.

In comparison with the commercial harvests of Dungeness crab in waters near Juneau and Ketchikan, the estimated total personal use or subsistence harvests of Dungeness crab were substantial (Table 20). Assuming that some harvest of Dungeness crab occurs outside the survey period (October through mid-April), and that some additional personal use/subsistence harvest occuring within these areas is not sampled, it is likely that the personal use/subsistence harvest in these two areas is about 40% of the total Dungeness crab harvest. Harvest of tanner crab by the personal use/subsistence fisheries appears to be very minor in comparison to the commercial fishery for tanner crab (Table 20).

Roadside Fisheries

Creel surveys have been done on river systems in the Haines and Yakutat areas since 1985 and in Blind Slough since 1983 to monitor trends in angler use of these areas. Information from the surveys has been used for inseason management, such as emergency closures, to ensure adequate escapements. Creel survey data are also used to formulate regulatory changes enacted by the Alaska Board of Fisheries.

Chinook Salmon Fisheries:

The sport fishery for chinook salmon in Blind Slough has developed rapidly within the past five years (Table 21). Although effort in Blind Slough increased during 1988, the total harvest and catch of chinook salmon declined from 1987 levels. As this fishery currently takes place upon a chinook salmon return well in excess of broodstock needs for Crystal Lake hatchery, in-season monitoring of chinook salmon catches by on-site creel surveys is of less importance than in the past.

Harvests of wild chinook salmon in the Situk River near Yakutat have been closely monitored since 1985 (Table 22). In-season management action was taken in both 1986 and 1988 to curtail sport harvests of chinook salmon. Although harvests total less than 300 large chinook salmon, this fishery continues to attract a large amount of sport effort and interest.

Returns of age 2-ocean chinook salmon to the Juneau roadside release sites were insufficient to generate substantial sport fisheries during 1988. As normally most chinook salmon return as 3-ocean or 4-ocean fish, substantial sport fisheries should be more likely to develop in 1989 and 1990 from the 1986 releases. Harvests of chinook salmon from these releases in the Juneau marine fishery totaled an estimated 166, of which 94 were from Auke Creek (tag codes 4-26-1,3 & 8), 43 from Sheep Creek (tag code 4-26-6), and 29 from Fish Creek (tag code 4-26-7) (Appendix Table 18). Assuming that harvests in

Table 20. Comparison of estimated harvest in pounds of Dungeness and tanner crab in Juneau and Ketchikan personal use/subsistence fisheries during 1988-1989 sampling periods with commercial harvests in nearby waters.

	Weig	ht in Pounds ¹ (%	()
	Personal Use/ Subsistence	Commercial ²	Total.
<u>Dungeness Crab</u>			
Juneau	14,856 (33%)	30,288 (67%)	45,144
Ketchikan	20,799 (37%)	35,900 (63%)	56,699
Tanner Crab			
Juneau	7,910 (2%)	368,838 (98%)	376,748

Personal use/subsistence weight in pounds estimated assuming average Dungeness crab weight of 2.3 lb. and average tanner crab weight of 2.6 lb.

Commercial harvest near Juneau was that in commercial fishing subdistricts 115-10, 111-50, 111-40, 111-41, 111-32, 111-31. Commercial harvest in Ketchikan was that in commercial district 101.

Table 21. Estimated chinook salmon sport harvest and total catch in the Blind Slough terminal harvest area near Petersburg and the Situk River near Yakutat.

Blind Slough

	Cumuran	Effort	Chinook Salmon Kept			Chinook	Chinook Salmon Released			Total Chinook Salmon Caught		
ear (Survey Dates	(Angler- Hours)	>28"	<28"	Total	>28"	<28"	Total	>28"	<28"	Total	
983	6/12-7/30	2,272	0	221	221	14	41	55	14	262	276	
1984	6/03-7/14	1,640	0	105	105	141	14	155	141	119	260	
985	6/03-8/04	3,430	135	77	212	502	48	550	637	125	762	
986	6/02-7/27	3,835	346	210	556	256	86	342	602	296	898	
987	6/01-7/26	4,555	585	173	758	502	159	661	1087	332	1,419	
verage		3,146	213	157	37 0	283	70	353	496	227	723	
988	6/13-8/14	4,917	469	177	646	348	167	515	817	344	1,161	

Situk River

		Effort	Chinook Salmon Kept			Chinook Salmon Released			Total Chinook Salmon Caught		
Survey Year Dates	(Angler- Hours)	>16"	<16"	Total	>16"	<16"	Total	>16"	<16"	Total	
1985	6/10-7/21	4,958	294	217	511	123	210	333	417	427	844
1986	6/09-7/13	3,568	0	37	37	704	0	704	704	37	741
1987	6/15-8/09	3,852	75	319	394	270	90	360	345	409	754
Average		4,126	123	191	314	366	100	466	489	291	780
1988	6/06-8/14	6,715	185	3	188	124	31	155	309	34	343

Table 22. Estimated coho salmon harvest and catch within the Situk River, Lost River, and Ankau Lagoon systems near Yakutat and the Chilkat and Chilkoot rivers near Haines, 1985-1988.

			Effort		Coho	Salmon	
		Survey	(Angler-				Harvest Per
Area	Year	Dates	Hours)	Kept	Released	Total	Hour
Situk River	1985	8/05-10/13	15,099	3,074	1,086	4,160	0.20
	1986	8/16-10/15	12,267	1,448	192	1,640	0.12
	1987	7/27-10/11	8,122	1,770	365	2,135	0.22
	Mean		11,829	2,097	548	2,645	0.18
	1988	8/01-10/09	11,678	1,886	631	2,517	0.16
Lost River	1985	8/12-10/13	10,666	4,001	1,256	5,257	0.38
	1986	8/16-10/15	8,428	1,339	127	1,466	0.16
	1987	8/17-10/11	6,741	1,839	114	1,953	0.27
	Mean		8,612	2,393	499	2,892	0.28
	1988	8/15-10/09	7,373	1,800	268	2,068	0.24
Ankau Lagoon	1985	No data					
Alikau Lagoon	1986	8/16-10/15	8,083	1,384	480	1,864	0.17
	1987	8/17-10/11	6,615	1,377	347	1,724	0.21
	Mean		7,349	1,381	414	1,794	0.19
	1988	8/15-10/09	11,526	2,429	536	2,965	0.21
Chilkoot River	1985	9/02-11/03	6,530	742			0.11
Director Killer	1986	9/01-10/31	10,790	708			0.07
	1987	9/08-11/01	5,209	378	6	384	0.07
	Mean		7,510	609			0.08
	1988	9/12-11/06	3,952	381	70	451	0.11
Chilkat River	1985	9/02-11/03	4,965	777			0.16
OHITCHUL KIVOI	1986	9/01-10/31	3,061	194			0.06
	1987	9/08-11/01	3,217	81	5	86	0.03
	Mean		3,744	351			0.09
	1988	9/12-11/06	3,687	522	117	639	0.17

the sport fishery are an index to survival of a given tag lot, returns of chinook salmon to the Auke Creek and Sheep Creek release sites in 1989 should be greater than those returning to Fish Creek and Montana Creek.

Coho Salmon Fisheries:

Roadside fisheries for coho salmon are extremely popular in the Haines and Yakutat areas. Moderate sized runs to the Chilkat and Chilkoot rivers near Haines are fished extensively although effort varies considerably with run strength (Table 22). More productive systems in the Yakutat area support higher levels of angler effort, along with higher coho salmon harvests and harvest rates.

Enhancement efforts in the Juneau area for sea-run coho salmon returning during 1988 failed to generate viable sport fisheries. Survival rates of hatchery coho salmon released in 1987 within the region were generally poor, and returns of wild fish were also very poor within some areas of the region. A total of 663 coho salmon adults returned to the Sheep Creek hatchery during 1988 (personal communication, 11 August 1989, John Ennor, Sheep Creek Hatchery, 4451 Thane Road, Juneau, AK 99801), but even these returns were not enough to generate a substantial sport fishery. Possibly the fish moved through the area so quickly that anglers were unable to target on them effectively or perhaps the fishery was not sufficiently advertised. At Dredge Lakes, coho salmon were available within the holding pond for an extended period, but the fish were so dark that anglers often reported releasing their fish.

Other Salmonid Fisheries:

Salmonid species such as pink salmon, sockeye salmon, and steelhead support popular roadside fisheries in the Yakutat or Haines areas. Steelhead have been monitored in the Situk River during the spring since 1985 and this fishery appeared to have stabilized through 1987 (Table 23). In 1988, spring angler effort increased and the estimated catch of steelhead was the highest recorded. Much of the fishery is catch and release oriented as in 1988 about 12 steelhead were released for every one taken. Summer and fall sport fisheries for sockeye and pink salmon and Dolly Varden in the Chilkoot River near Haines have been monitored since 1985, and effort within this sport fishery also seems to have stabilized or even declined (Table 24).

CONCLUSIONS AND RECOMMENDATIONS

Large changes in southeast Alaska sport fisheries have occurred over the past decade. Wild stocks of fish support most of the sport fisheries, but increasing enhancement efforts have led to increases in harvests of hatchery chinook and coho salmon. These enhancement efforts can be costly and creel surveys are one of the few means to evaluate the success of these programs. During 1988, harvest survey programs showed that contributions of hatchery coho salmon to sport fisheries were extremely poor, but that chinook salmon fisheries benefited greatly from enhancement. Creel surveys of both marine boat and roadside fisheries will continue to be necessary to evaluate and

Table 23. Estimated steelhead harvest and catch within the Situk River near Yakutat, 1985-1988.

	Survey	Effort (Angler-	Steelhead			Catch Per	Ratio released
Year	Dates	Hours)	Kept	Released	Total	Hour	to kept
1985	4/15-7/07	12,664	428	4,584	5,012	0.40	10.7
1986	4/14-7/06	12,283	287	2,094	2,381	0.19	7.3
1987	4/06-6/28 ¹	10,542	391	3,791	4,182	0.40	9.7
Mean		11,830	369	3,490	3,858	0.33	9.5
1988	3/28-7/03	16,379	423	4,991	5,414	0.33	11.8

 $^{^{\}mathrm{1}}$ No survey between 5/26 and 6/14 in 1987.

Table 24. Estimated harvest and harvest per angler-hour of sockeye salmon, pink salmon, and Dolly Varden within the Chilkoot River near Haines, 1985-1988.

Year	Survey Dates	Effort (Angler- Hours)	Harvest			Harvest per Hour		
			Sockeye Salmon	Pink Salmon	Dolly Varden	Sockeye Salmon	Pink Salmon	Dolly Varden
1985	7/15-11/03	26,103	1,235	4,425	5,234	0.05	0.17	0.20
1986	7/14-10/31	32,484	2,873	1,422	3,941	0.09	0.04	0.12
1987	7/13-11/01	25,298	1,007	5,912	6,897	0.04	0.23	0.27
Mean		27,962	1,705	3,920	5,357	0.06	0.14	0.19
1988	6/20-11/06	22,633	609	3,590	5,829	0.03	0.16	0.26

improve the cost effectiveness of stocking programs.

Data from existing marine boat surveys are used for a variety of purposes and the program should be continued. Continuing the shellfish harvest estimates as a component of the ongoing marine harvest studies will provide valuable information in evaluating performance of this fishery and in commenting upon potential regulation changes during Alaska Board of Fisheries meetings. The Juneau and Ketchikan boat fisheries are the largest and most controversial sport fisheries in the region, and monitoring of these complex fisheries is essential. Performance data and biological information gathered from monitoring of the Haines chinook salmon boat fishery will provide essential data in efforts to rebuild Chilkat River stocks of chinook salmon.

Marine boat fisheries in Petersburg, Wrangell, and Sitka are primarily targeted on chinook salmon and harvest rates are excellent in comparison to the Juneau and Ketchikan fisheries. In-season monitoring of the harvests and hatchery contributions of chinook salmon for the Petersburg, Wrangell, and Sitka fisheries is used for U.S./Canada in-season and post-season reporting purposes as well as for public education and regulatory analysis. Although monitoring is not necessary for in-season sport fish management, these fisheries constitute a significant portion of the sport fishing effort in the central portion of the region. Given U.S./Canada treaty catch limits on chinook salmon, current user group conflicts in catch allocations have a good chance of intensifying. With no current information on fishery performance or catch composition in these fisheries, rational management of combined sport and commercial chinook salmon fisheries becomes extremely difficult. Harvests of Pacific halibut, rockfish, and coho salmon within the Sitka marine fishery are also substantial, and the Sitka fishery will probably continue to develop rapidly due to growth in the charter boat industry.

Current roadside surveys are generally targeted on large freshwater fisheries or on enhanced fisheries and these surveys also provide valuable information for proposed regulatory changes, public education, and baseline data on the fisheries. In some instances, such as at Blind Slough, where chinook salmon returns are expected to be well in excess of brood stock needs, creel surveys are generally not necessary for in-season management purposes. In other roadside fisheries, such as the Situk River chinook salmon fishery and the Chilkoot River coho salmon fishery, creel surveys are needed to evaluate the need for in-season management action.

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APPENDIX A - SAMPLING STRATIFICATION STRUCTURE

APPENDIX A

SAMPLING STRATIFICATION STRUCTURE

Marine Fisheries

Ketchikan Marine:

Seven access point sampling locations along the Ketchikan roadside system were assigned to access strata as follows:

- 1. Heavy use docks and boat launches:
 - a. Bar Harbor sections 1A and 1B combined (during the early day stratum);
 - b. Bar Harbor sections 2A and 2B combined (during the early day stratum);
 - c. Bar Harbor section 1A (during the late day stratum);
 - d. Bar Harbor section 2A (during the late day stratum);
 - e. Bar Harbor section 2b (during the late day stratum);
 - f. Mountain Point boat launch;
 - d. Clover Pass resort; and
 - e. Knudson Cove harbor.
- 2. Low use docks and boat launches:
 - a. Salmon Falls resort;
 - b. Bar Harbor section 1B (during the late day stratum);
 - b. Hole in the Wall harbor; and
 - c. Thomas Basin harbor.

Six of the seven access points were sampled in 1987 (Bingham, et al. 1988), but the Salmon Falls resort was a new access area just starting operations in 1988. Due to its size, Bar Harbor was split into four areas during late day sampling, and two areas in the early day.

Due to the lengthy travel times between some of the harbors, only one harbor was sampled by each technician per sampling day.

The optimal allocation procedures, modified by manpower constraints, resulted in about 70% of the samples going to high use docks, with 30% going to low use docks. During the weekdays, the sampling fractions were low use/early day - 13%, low use/late day - 13%, heavy use/early day - 28%, and heavy use/late day 46%. On the weekend/holidays, the sampling fractions were low use/early day - 18%, low use/late day - 18%, heavy use/early day - 26%, and heavy use/late day - 38%.

Petersburg Marine:

The North/Middle harbor was assigned to the high use access stratum, while the South harbor was assigned to the low use stratum. Optimal allocation procedures, as modified by manpower constraints, resulted in approximately equal sampling effort being assigned to the four heavy/low use dock and early/late day sampling strata on the weekend/holidays. During the weekdays, the low use/late day stratum received about 49% of the sampling effort while the remaining effort was equally distributed among the other three sampling strata.

Wrangell Marine:

The two access locations (Town and Shoemaker harbors) sampled in Wrangell were not split into high and low use strata. In the late day, Town Harbor was split into the Inner Town Harbor and Outer Town Harbor access locations. During early day samples, however, the entire Town Harbor was sampled.

After an optimal allocation selection, samples were allocated as follows. During weekdays, approximately 18% of the samples were allocated at random to the early day stratum, with the remaining samples allocated to the late day stratum. On the weekends, 23% of the samples were allocated at random to the early day sampling period.

The King Salmon Derby in Wrangell was held from 14 May to 30 May 1988. It was not treated as a separate stratum for sampling or estimation purposes.

Sitka Marine:

Access locations were assigned to access strata for the Sitka area as follows:

- 1. Heavy use docks and boat launches:
 - a. Crescent Harbor;
 - b. Sealing Cove Harbor; and
 - c. Thompson Harbor.
- 2. Low use docks and boat launches:
 - a. the Cove Harbor; and
 - b. Starrigavin boat launch.

Before June 20, approximately 40% of the sampling effort was expended on low use harbors. Beginning on June 20, however, only the three heavy use access locations were sampled. This change was made because analysis of 1987 data indicated that 40% of the sampled effort was expended at the low use harbors, but less than 5% of the chinook were landed at them. Reallocating sampling effort to the high use harbors increased precision of the estimates with only a small decrease in the portion of the fishery sampled.

During weekdays, approximately 52% of the samples were allocated at random to the early day stratum, with the remaining samples allocated to the late day stratum. On the weekends, 48% of the samples were allocated at random to the morning and one-half to the afternoon.

Juneau Marine:

Access locations were assigned to access strata for the Juneau area as follows:

- 1. Heavy use docks and boat launches:
 - a. Auke Bay "docks": Auke Bay boat launch and Dehart's Marina, during the early day stratum;
 - b. Auke Bay boat launch, during the late day stratum;
 - c. Fishermen's Bend marina.
 - d. Dehart's Marina:
 - e. Amalga Harbor;
 - f. Tee Harbor; and
 - g. Auke Bay Government dock.
- 3. Low use docks and boat launches:
 - a. Douglas Harbor;
 - b. Aurora Harbor;
 - c. Harris Harbor;
 - d. North Douglas boat launch and;
 - e. Tee Harbor area unimproved boat launch.

The exception being that prior to 1 May, Tee Harbor was "unavailable" for sampling as this harbor was closed.

Optimal allocation procedures, as modified by manpower constraints, were used to distribute sampling effort among strata as follows. During the weekdays, both of the early day harbor strata received 6 to 7% of the sampling effort while the low use/late day stratum received 36% of the effort and the heavy use/late day stratum received 51% of the sampling effort. On the weekend/holidays, the early day harbor strata received 8% of the effort while both of the late day strata received 42% of the effort.

Haines Marine:

Due to conservation concerns with chinook salmon in the Haines area, some modifications to the sampling stratification were made. In 1988, the head of Chilkat Inlet north of a line extending from Anchorage Point to a department marker directly north of the Letnikof Cove boat ramp was closed to sport fishing for chinook salmon from 15 April through 15 July. Also due to low chinook salmon catch rates, in-season management action by emergency order was also taken. The chinook salmon fishery was closed in both Chilkat and Chilkoot Inlets from 13 June through 25 June, but on June 26, Chilkoot Inlet was reopened to chinook salmon fishing, while Chilkat Inlet north of the latitude of Seduction Point remained closed through 14 July.

Weekly estimates of chinook salmon harvests were made during the period from 9 May through 12 June so that harvests could be very closely monitored. Due to the closure of the fishery, there was no creel survey from 13 June through 26 June. From 27 June to 10 July, weekly harvest estimates were again calculated although no chinook salmon were sampled.

The heavy use access strata contained the Letnikof Cove access location, while the low use access stratum contained the Chilkat State Park launch

ramp and the Small Boat Harbor. About 37% of the sampling effort was allocated to the weekday/heavy use dock strata, 19% to the weekday/low use dock strata, 34% to the weekend/holiday/heavy use strata, and 11% to the weekend/holiday/low use strata.

Roadside Fisheries

Petersburg Area (Blind Slough):

Estimates of fishery characteristics were obtained from a creel survey based on randomized sampling of completed angling trips at the only major access point into the Blind Slough fishery. Sampling effort was allocated to provide weekly estimates of effort, harvest, and HPUE. Days within each week in the fishery were stratified into weekdays and weekend-holidays. There were four sampling periods of 3 hours and 45 minutes during each day. Period 1 started at 0730 hours and ended at 1115 hours, period 2 began at 1116 hours and ended at 1500 hours, period 3 began at 1501 hours and ended at 1845 hours, and period 4 began at 1846 hours and ended at 2230 hours. A simple random sample of five of these periods for both the weekday and weekend-holiday strata was chosen each week. No more than three sampling periods could be selected in one day. Data analysis procedures were the same as those used for the marine boat recreational direct expansion harvest surveys. All chinook salmon harvested by Blind Slough anglers were assumed to be of hatchery origin and therefore no heads, scales, or lengths were collected.

Juneau Roadside:

The length of the fishing day and the general stratification structure for the roadside survey was the same as for the marine boat fishery. About 38% of the samples were allocated to the morning sampling period. Sampling was split approximately 50% to weekdays and 50% to weekend/holidays as that was thought to be approximately the relative amount of angling effort occurring at these times. Starting locations for each survey were randomly chosen, but then the rest of the route was selected so that mileage was minimized. The duration of surveys varied in length depending on season, weather, and route, but typically took less than the time allotted in the schedule. For this reason, starting times for the surveys were randomly selected by the creel technician after they estimated survey duration.

In addition to the normal creel survey, a special creel survey at Twin Lakes was conducted on 11 June 1988 during Family Fishing Day. Due to the large amount of expected effort, this event would not otherwise have been adequately sampled. Angler effort and harvest for the period from 10:00 to 16:00 was estimated using four angler counts and interview sessions during this period.

Haines Roadside:

The sampling day was defined as starting at approximately 0600 and ending at the nearest 15 minute increment to the average end of civil twilight within

each biweekly period. Each sampling day was subdivided into four equal sampling periods during the first six seasonal strata (20 June - 25 September). After 25 September, the sampling day was subdivided into three equal sampling periods.

Samples were selected at random within each seasonal stratum from the total number of available samples within either the weekday or weekend-holiday stratum. No more than two samples were scheduled in any one day; and the sample period combination of period one and period four within one day was not permitted.

For each sample selected, the interviews and counts started at either site one (upstream of the ADF&G weir on the Chilkoot River) or site four (the Chilkat River), selected at random. Within each of the four sites sampled, either an angler count or the interviews were conducted first (selected at random). Angler counts took no longer than one-half hour within any one of the four sites.

Yakutat Roadside:

During the period from 28 March to 14 August 1988, the Yakutat roadside survey was directed at sampling effort and harvest of anglers accessing the Situk River at both the Lower Landing and the Nine Mile Bridge. For this direct expansion type creel survey, each day in the fishery was divided into early and late day strata in which there were two possible sampling periods. The days of the week (Monday-Sunday) were not separated into weekdays versus weekend-holidays strata due to the nature of the Yakutat fisheries (i.e., many fly-in vacationers). Each fishing day was defined as starting at 0600 and ending on the nearest whole hour for the average civil twilight within each biweekly period. Samples were constrained such that no more than three samples were conducted in one day.

During the early day stratum, two of the samples were randomly assigned to the Nine Mile Bridge and three for the Lower Landing site. During the late day stratum, two samples were allocated to the Nine Mile Bridge and five samples to the Lower Landing site. The sample size allocation between early and late day strata and between sites reflected the expected magnitude of angler effort within each unique combination.

From 15 August 1988 to 9 October 1988, the harvest surveys directed at coho salmon fisheries consisted of a direct expansion creel survey of the Situk River (only the Lower Landing access point sampled) and Lost River/Tawah Creek systems and a count type creel survey of the Ankau Lagoon complex. The fishing day was stratified and subdivided into sampling periods in a manner similar to the spring and summer period. During the last two biweeks, the hours of daylight were reduced such that the fishing day was divided into three sampling periods with no morning afternoon stratification. No more than two samples were conducted in one day.

During the first portion of the fall period, two samples were randomly allocated to the Ankau Lagoon in in the early day stratum and four in the late day stratum. Similarly, three samples were allocated to the early day-Lower Landing site and five samples to the late day-Lower Landing site. During the last two biweeks, the Ankau Lagoon site was allocated six samples, and the Lower Landing site was allocated the remaining nine

samples. These sampling allocations were based on the expected amount of angler effort occuring within these unique strata.

APPENDIX B - ESTIMATION METHODS FOR HARVEST, EFFORT, AND HPUE

APPENDIX B

ESTIMATION METHODS FOR HARVEST, EFFORT, AND HPUE

The following equations were used for estimation of harvest and effort for the direct expansion completed-trip interview type creel surveys. The first step involved the estimation of angler effort:

 E_h = estimated boat-hours in the hth stratum of the fishery;

$$= R_h (e_{h..} + r_{h.})$$
 [1]

h = subscript denoting stratum (as defined by the combination of seasonal period, access location type, type of fishing day);

R_h - total number of hours in the hth stratum, defined by the number of hours available for boat-parties to return to access locations;

e_{h.} = total effort (in hours) expended by boat-parties interviewed within the hth stratum;

$$= \sum_{i=1}^{n_h} e_{hi}.$$
 [2]

i = subscript denoting an individual sample within the hth
 stratum;

n_h = number of samples collected within the hth stratum;

ehi. = estimated effort for the ith sample within the hth
stratum;

$$= 0_{i} \overline{e}_{hi}$$
 [3]

$$= o_{i} + p_{i}$$
 [4]

o_i = number of boat-parties interviewed during the ith
 sample;

$$\stackrel{-}{e_{hi}} = \stackrel{\circ_{i}}{\underset{j=1}{\Sigma}} (e_{hij}) \div o_{i}$$
 [5]

j = subscript denoting the boat-party interviewed during the ith sample within the hth stratum;

ehij = effort (in boat-hours) of the jth boat-party
 interviewed in the ith sample in the hth stratum;

r_h. = total number of hours sampled in the hth stratum;

$$= \sum_{i=1}^{n_h} r_{hi}$$
 [6]

 r_{hi} = hours sampled during the ith sample in the hth stratum;

 $V_h(E_h)$ = the variance estimate for the estimate of E_h , obtained by the standard formula for the estimation of the variance of a product of a constant and a variance (Lehmann 1975);

$$= R_h^2 \mathring{V}(e_h \div r_h)$$
 [7]

 $V(e_{h..} \div r_{h.})$ = the variance estimate for the effort rate (i.e., the ratio of $e_{h..}$ to $r_{h.}$), which is estimated approximately by the standard formula for the variance of the ratio of random variables (Cochran 1977);

$$\approx \{ \overline{e}_{h..} + \overline{r}_{h.} \}^{2} \{ [s_{e}^{2} + (\overline{e}_{h..})^{2}] + [s_{r}^{2} + (\overline{r}_{h.})^{2}] - [(2 cov_{h}(e,r)) + (\overline{e}_{h..}\overline{r}_{h.})] \}$$
[8]

 $e_{h..}$ = mean effort (in boat-hours) for the n_h samples in the hth stratum;

$$= e_{h, \cdot} \cdot n_{h}$$
 [9]

 r_{h} = mean hours sampled for the n_{h} samples in the hth stratum

$$= r_h + n_h$$
 [10]

se = variance estimate associated with estimating the effort component of the effort rate, obtained by using a modified two-stage sampling approach estimator (Cochran 1977);

$$= \{ [(R_h - r_h) + R_h] [s_{B_e}^2 + n_h] \}$$

$$+ \{ [r_h + (R_h n_h)] [s_{W_e}^2 + n_h] \}$$
[11]

 $s_{B_{-}}^{2}$ = the between sample variance for effort;

$$= \sum_{i=1}^{n_h} (\hat{e}_{hi} - \hat{e}_{h.})^2 \div (n_h - 1)$$
 [12]

 $s_{W_{e}}^{2}$ = the within sample (between boat) variance for effort;

$$= \sum_{i=1}^{n_{h}} \{ [(0_{i} - o_{i}) \div 0_{i}][0_{i}^{2}][1 \div o_{i}]$$

$$\begin{bmatrix} o_{i} \\ j=1 \end{bmatrix} (e_{hij} - e_{hi})^{2} \div (o_{i} - 1) \} \}$$
[13]

 s_r = variance estimate associated with estimating the hours sampled component of the effort rate

$$= [(R_h - r_h) \div (R_h)][1 \div n_h] \begin{bmatrix} n_h \\ \sum_{i=1}^{n_h} (r_{hi} - r_{h.})^2 \div (n_h - 1)]$$
 [14]

 $cov_h(e,r)$ = covariance estimate between the effort and hours sampled components of the effort rate estimate;

=
$$[(R_{h} - r_{h.}) \div (R_{h})][1 \div n_{h}]$$
 [15]
 $\begin{bmatrix} n_{h} & - \\ \sum_{i=1}^{n} \{(e_{hi.} - e_{h..})(r_{hi} - r_{h.})\} \div (n_{h} - 1)]$

The approach presented above for variance estimation is valid for a stratified simple random sampling design with only one stage of sample selection. Our use of this approach was not entirely correct, in that

selection of time to sample within a unique combination of stratum definitions, was not a simple random process. As such, the location to sample within access location stratum represents a second stage of sampling. Due to the complexities of the sample allocation process and due to the limitations of sampling density (i.e., budgetary constraints), we were not able to estimate the variance for the second stage. However, the use of a single-stage sampling approach is conservative in that the resulting variance estimates will be larger than if a multi-stage estimator could be applied.

Harvest per unit effort (HPUE) in terms of fish harvested per rod-hour for both targeted and non-targeted effort was estimated as follows for the direct expansion creel surveys:

P_h = estimated total harvest per unit effort for the hth stratum of the fishery;

$$= \stackrel{\wedge}{H_h} \div \stackrel{\wedge}{E_h}$$
 [16]

where h is defined above;

E_h = estimated angler effort in rod-hours (either targeted or non-targeted) for the hth stratum of the fishery, also obtained by equation one, above;

 $v_h(P_h)$ = estimated variance of the HPUE estimate for the hth stratum;

$$\approx \{ \overline{h}_{h..} \div \overline{e}_{h..} \}^{2} \{ [s_{h}^{2} \div (\overline{h}_{h..})^{2}] + [s_{e}^{2} \div (\overline{e}_{h..})^{2}] - [(2cov_{h}(h,e)) \div (\overline{h}_{h..}\overline{e}_{h..})] \}$$
[17]

hh.. = overall mean harvest per boat in the hth stratum, estimated by substituting the appropriate harvest statistic into equation nine, above;

 $e_{h..}$ = see equation nine, above;

s² = variance estimate associated with estimating the harvest component of HPUE, obtained by substituting the appropriate harvest statistics into equations 11-16, above:

e variance estimate associated with estimating the angler effort component of HPUE, obtained by substituting either targeted or non-targeted rod-hour effort statistics into equations 11-16, above;

 $cov_h(h,e)$ = covariance estimate between harvest and angler effort components of HPUE for the hth stratum;

=
$$[(R_h - r_h) \div R_h] [cov_B(h,e) \div n_h] +$$

 $[r_h \div (R_h n_h)] [cov_W(h,e) \div n_h]$ [18]

where $\mathbf{R}_{h}\text{, }\mathbf{r}_{h}\text{, }\mathbf{0}_{h}\text{, and }\mathbf{o}_{h}$ are as defined above;

 $\operatorname{cov}_B(h,e)$ = the between sample covariance component of the covariance estimate between harvest and angler effort;

$$= \sum_{i=1}^{n_h} [\hat{h}_{hi} - \bar{h}_{h.}] \hat{e}_{hi} - \bar{e}_{h.}] \div (n_h - 1)$$
 [19]

hhi. = estimated harvest for the ith sample within the hth stratum, and is obtained by substituting the appropriate harvest statistic into equations 3-5, above;

e_{hi.} = see equations 3-5, above;

 $\operatorname{cov}_{\overline{W}}(h,e)$ = the within sample covariance component of the covariance between harvest and angler effort;

$$= \sum_{i=1}^{n_{h}} \{ [(0_{i} - o_{i}) \div 0_{i}][0_{i}^{2}][1 \div o_{i}]$$

$$[\sum_{j=1}^{o_{i}} (h_{hij} - \overline{h}_{hi.})(e_{hij} - \overline{e}_{hi.}) \div (o_{i} - 1)] \}$$
[20]

Harvest per unit effort estimates across all strata (e.g., for one seasonal

period disregarding access type, day type, etc.) were obtained as follows:

P_C = combined HPUE estimate over selected strata;

$$= \begin{pmatrix} q & \wedge & q & \wedge \\ \sum_{h=1}^{\Sigma} H_h \end{pmatrix} \div \begin{pmatrix} q & \wedge & \\ \sum_{h=1}^{\Sigma} E_h \end{pmatrix}$$
 [21]

q = the number of stratum to be combined;

 $^{\circ}$ $^{\circ}$ = the variance of the across-strata estimate of HPUE;

$$= \{ \hat{H}_{c} \div \hat{E}_{c} \}^{2} \{ [\hat{V}_{Hc} \div \hat{H}_{c}^{2}] + [\hat{V}_{Ec} \div \hat{E}_{c}^{2}]$$

$$- [2cov_{c}(H,E) \div (\hat{H}_{c}\hat{E}_{c})] \}$$
[22]

$$\stackrel{\wedge}{H}_{c} = \stackrel{q}{\underset{h=1}{\Sigma}} \stackrel{\wedge}{H}_{h}$$
[23]

$$\stackrel{\circ}{E}_{c} = \frac{q}{h=1} \stackrel{\circ}{E}_{h}$$
[24]

$$\hat{\mathbf{V}}_{Hc} = \sum_{h=1}^{q} \hat{\mathbf{V}}_{h}(\hat{\mathbf{H}}_{h})$$
 [25]

$$\hat{\mathbf{V}}_{\mathbf{Ec}} = \frac{\mathbf{q} \hat{\mathbf{A}} \hat{\mathbf{A}}}{\mathbf{b}_{\mathbf{h}}^{\mathbf{\Sigma}} \mathbf{V}_{\mathbf{h}}(\mathbf{E}_{\mathbf{h}})}$$
[26]

$$cov_{c}(H,E) = \sum_{h=1}^{q} (cov_{h}(h,e))$$
 [27]

Variance equations 25 and 26, used above, indicate an assumed independence of the various harvest and effort estimates among strata. This assumptions is not entirely valid in that positively correlated levels of effort and harvest would be expected at the various access strata (e.g., heavy use and low use) during similar time periods. However, this assumption is conservative in nature such that the variance estimates obtained would be positively biased.

For the count type creel survey (Juneau derby) a stratified random estimator was used to estimate effort in boat-hours. The average boat count for each day of the derby was multiplied by the total number of available fishing hours within each day. The effort estimates and the associated variance estimates were obtained according to the following equations (essentially

following the approach of Von Geldern and Tomlinson 1973):

E_h = estimated boat-hours expended on the hth day of the derby fishery;

$$= U_{\mathbf{h}} \bar{\mathbf{x}}_{\mathbf{h}}$$
 [28]

h = subscript denoting day of the derby;

U_h = total number of hours (available for fishing) on the hth day;

 x_h = mean number of boats fishing for the hth day;

$$= \sum_{i=1}^{d_h} (x_{hi}) + d_h$$
 [29]

i = subscript denoting sample within the hth day;

 d_h = number of samples (i.e., counts) completed on the hth day;

x_{hi} = number of recreational boats fishing counted in the ith sample in the hth day;

 $V_h(E_h)$ = the variance estimate for the estimate of E_h ;

=
$$[(D_h - d_h) \div D_h] [U_h^2 (s_h^2 \div d_h)]$$
 [30]

 \mathbf{D}_{h} = number of possible counts which can be conducted on the hth day (approximately equal to \mathbf{U}_{h} , as each flight takes approximately one hour to complete);

$$s_h^2 = \sum_{i=1}^{d_h} (x_{hi} - x_h)^2 \div (d_h - 1)$$
 [31]

Boat-party catch and harvest rates were estimated from interview data using a stratified random estimator, according to the following equations:

Th = estimated total catch or harvest per unit effort for the hth day of the derby fishery;

$$= \begin{bmatrix} \sum_{i=1}^{n_h} \begin{pmatrix} o_i \\ \sum_{j=1}^{n_h} c_{hij} \end{pmatrix} \end{bmatrix} \div \begin{bmatrix} \sum_{i=1}^{n_h} \begin{pmatrix} o_i \\ \sum_{j=1}^{n_h} c_{hij} \end{pmatrix} \end{bmatrix}$$
[32]

h = subscript denoting day of the derby;

i = subscript denoting an individual interview sample
 within the hth day;

j = subscript denoting the boat-party interviewed in the
 ith sample;

n_h = number of samples collected within the hth day;

o_i = number of boat-parties interviewed within the ith sample;

chij = catch or harvest of the jth boat-party interviewed on the ith sample in the hth day;

e_{hii} = effort of the jth boat-party interviewed;

 $V_h(T_h)$ = estimated variance of the catch per unit effort (CPUE) or HPUE estimate in the hth day of the derby fishery;

$$\approx \{ (\overline{c}_{h..} + \overline{e}_{h..})^{2} \{ (s_{c}^{2} + (\overline{c}_{h..})^{2}) + (s_{e}^{2} + (\overline{e}_{h..})^{2}) - [(2 cov(c,e)) + (\overline{c}_{h..} \overline{e}_{h..})] \}$$
[33]

ch.. = overall mean of means catch or harvest per boat on the hth day;

$$= \sum_{i=1}^{n_h} (c_{hi.}) \div n_h$$
 [34]

chi. = mean catch per boat within the ith sample on the hth day;

$$= \sum_{i=1}^{o_i} (c_{hij}) \div o_i$$
 [35]

eh.. = overall mean of means effort per boat on the hth day of the derby, calculated by replacing the appropriate effort statistics into equation 34, above;

s² = variance estimate associated with estimating the catch component of the CPUE or HPUE estimate;

$$= [(R_h - r_h) \div R_h][s_{B_c}^2 \div n_h] + [r_h \div (R_h n_h)][s_{W_c}^2 \div n_h]$$
 [36]

R_h = total number of hours on the hth day, defined by the number of hours available for boat-parties to return to all of the associated access locations on the hth day;

r_h = see equation 6, above;

s² = the between samples variance component of the variance estimate for catch;

$$= \sum_{i=1}^{n_h} (\overline{c}_{hi.} - \overline{c}_{h..})^2 + (n_h - 1)$$
 [37]

 $s_{W_c}^2$ = the within sample variance component of the variance estimate for catch;

$$= \sum_{i=1}^{n_h} \{ [(0_i - o_i) + 0_i][1 + o_i] \}$$

$$[\sum_{j=1}^{o_i} (c_{hij} - c_{hi.})^2 + (o_i - 1)] \}$$
[38]

 o_h = see equation 14, above;

e variance estimate associated with estimating the effort component of the CPUE or HPUE estimate which is calculated by substituting the corresponding effort statistics into equations 36 through 38, above;

cov(c,e) = covariance estimate between the catch and effort
components of the CPUE or HPUE estimate;

=
$$[(R_h - r_h) \div R_h][cov_B(c,e) \div n_h] +$$

 $[r_h \div (R_h n_h)][cov_W(c,e) \div n_h]$ [39]

 $cov_B(c,e)$ = the between samples covariance component of the covariance estimate between catch and effort;

$$= \sum_{i=1}^{n_h} [(\bar{c}_{hi} - \bar{c}_{h..})(\bar{e}_{hi} - \bar{e}_{h..})] \div (n_h - 1)$$
 [40]

 $cov_W(c,e)$ = the within samples covariance component of the covariance estimate between catch and effort;

$$= \sum_{i=1}^{n_{h}} \{ [(0_{i} - o_{i}) \div 0_{i}][1 \div o_{i}]$$

$$[\sum_{j=1}^{o_{i}} (c_{hij} - c_{hi})(e_{hij} - e_{hi}) \div (o_{i} - 1)] \}$$
[41]

As indicated in equation 36, a modified two-stage estimator was used. However, the sampling design is more accurately a stratified random design. In the modified two-stage design we have defined period sampled as the primary level of sampling and boat-parties interviewed as the secondary level. Since the boat-parties interviewed represent a random component in the model rather than a fixed component, the secondary term in the corresponding variance equation does not include a finite population correction factor (fpc).

The next step involved estimating the harvest for each day of the derby:

H_h = estimated catch or harvest of the hth day;

$$= \hat{\mathbf{E}}_{\mathbf{h}} \hat{\mathbf{T}}_{\mathbf{h}}$$
 [42]

 $V_h(H_h)$ = estimated variance of the estimate of H_h , assuming independence of the estimates of effort and CPUE or HPUE, obtained by using the formula proposed by Goodman (1960) for the estimation of the variance of a product of two random independent variables;

$$= \hat{E}_{h}^{2} \hat{V}_{h}(\hat{T}_{h}) + \hat{T}_{h}^{2} \hat{V}_{h}(\hat{E}_{h}) - \hat{V}_{h}(\hat{E}_{h}) \hat{V}_{h}(\hat{T}_{h})$$
 [43]

Overall HPUE for the derby was estimated similarly to combined HPUE for the non-derby surveys (equations 23-28, above).

For both types of surveys (count and direct expansion) the final step in estimating the effort or harvest for the entire season or for unique combinations of individual sampling strata involved combining the stratum estimates:

H = overall estimated catch, harvest, or effort;

$$= \sum_{h=1}^{q} (H_h)$$
 [44]

q = number of strata to be combined;

$$= \sum_{h=1}^{q} (\hat{V}_h(\hat{H}_h))$$
 [45]

Approximate 95% confidence intervals (CI) were obtained for harvest and effort estimates from both direct expansion and count type surveys by assuming normality. Accordingly, CI limits are obtained as follows:

$$\hat{H} \pm 2 (\hat{V}(\hat{H}))^{\frac{1}{2}}$$
 [46]

The lower limit of the CI equal to either the value obtained by equation 46, or equal to the actual number of fish observed in the sampled harvest, whichever is greater. Since the harvest and effort estimates are not expected to be exactly normal these CI limits are only approximate. In particular we expect the upper limits to be non-conservative (i.e., the upper tail coverage will be less than the stated alpha level, or 0.025). This is because of the assumed upper tail skew to these type of statistics.

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APPENDIX C - APPENDIX TABLES

Appendix Table 1. Estimated effort and catches for the Ketchikan marine boat sport fishery, 11 April - 25 September 1988.

	APPROXIMATE		APPROXIMATE
	95% C.I. LOWER LIMIT	ESTIMATE 9	5% C.I. UPPER LIMIT
oat-hours Fished	77,384	88,779	100,174
Salmon-hours Fished	132,709	153,086	173,464
Malibut-hours Fished	59,368	70,657	81,946
ing cod-hours Fished	0	0	0
Rockfish-hours Fished	436	954	1,471
Bottomfish-hours Fished	60,308	71,611	82,913
Angler-hours Fished	197,054	225,779	254,505
Boat-Days Fished	13,793	16,011	18,230
arge Chinook Salmon Harvested	3,455	4,888	6,321
Derby Take-home	358	1,019	1,679
Derby Entered		509	
Derby Take-home & Entered	867	1,528	2,188
Large Chinook Salmon Released	11	149	481
Small Chinook Salmon Harvested	91	357	624
Derby Take-home	6	72	188
Derby Entered		8	
Derby Take-home & Entered	14	80	196
Small Chinook Salmon Released	11,752	15,804	19,857
Coho Salmon Harvested	3,980	5,525	7,069
Coho Salmon Released	2,511	4,386	6,260
Chum Salmon Harvested	452	671	891
Chum Salmon Released	· 3	31	73
ockeye Salmon Harvested	11	82	153
Sockeye Salmon Released	6	47	134
Pink Salmon Harvested	8.474	12.339	16.205
Pink Salmon Released	1,788	3,475	5,161
Pacific Halibut Harvested	5,667	7,317	8,967
Pacific Halibut Released	926	1,338	1,749
Steelhead Harvested	0	0	0
Steelhead Released	0	0	0
Cutthroat Trout Harvested	0	0	0
Cutthroat Trout Released	2	16	46
Dolly Varden Harvested	0	0	0
Dolly Varden Released	0	0	0
Ling Cod Harvested	673	932	1,191
Ling Cod Released	18	143	269
Kelp Greenling Harvested	11	67	124
Kelp Greenling Released	1	13	35
Unidentified Rockfish Harvested	6.145	8,871	11,598
Black Rockfish Harvested	66	221	376
Boccacio Harvested			
Copper Rockfish Harvested	95	383	672
Dusky Rockfish Harvested	97	381	665
Quillback Rockfish Harvested	2,093	4,090	6,086
Silvergrey Rockfish Harvested	266	550	834
Yelloweye Rockfish Harvested	1,485	2,122	2,760
Yellowtail Rockfish Harvested	12	70	135
Other Rockfish Harvested	293	788	1,282
	= ,0		_,_02
All Rockfish Harvested	13,231	17,477	21,722

Appendix Table 2. Estimated effort and catches for the Ketchikan marine boat sport fishery by seasonal period, 11 April - 25 September 1988.

						Sea	sonal Perio	od					
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby 1	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Number of Samples Number of Boats Counted	20 27	19 40	20 42	12 40	21 316	18 67	30 261	31 193	26 111	31 191	30 350	32 258	20 126
Number of Boats Interviewed Hours Sampled	27 130	40 124	42 130	40 78	304 138	67 117	256 195	192 201	108 162	191 201	348 191	258 207	126 129
Hours Available to Sample Boat-hours Fished	1,421	1,470	1,767	1,296	1,344	1,463	2,079	2,016	1,985	1,922	-	1,764	1,670
Estimate Variance almon-hours Fished	859 88,084	1,386 34,214	2,162 199,798	2,222 87 4 ,202	19,096 3,366,245	3,765 1,103,461	10,136 3,674,040	7,260 2,308,619		7,761 1,393,389	4,579,697		7,839 8,456,456
Estimate Variance	456 12,679	1,003 49,113	2,031 746,195	3,763 2,632,182	39,024 2,852,845	6,769 5,942,126	16,930 13,114,262	10,863 5,824,789	6,658 2,844,710	12,061 4,184,813	21,586 21,062,606	16,737 16,250,619	15,205 28,296,481
dalibut-hours Fished Estimate Variance	1,301 471,339	2,230 78,886	2,555 250,642	860 174,451	6,694 837,643	3,255 666,503	8,223 4,296,184	7,015 3,017,712		9,747 4,080,846		5,621 2,152,942	6,530 8,837,645
ing cod-hours Fished Estimate Variance	0	0	0	0	0	0	0 0	0	0	o 0	0	0	0
Rockfish-hours Fished Estimate Variance	23 453	0	0	0	136 3,595	25 554	62 3,204	118 5,615		101 9,044		0	0
Sottomfish-hours Fished Estimate Variance	1,323 442,844	2,230 78,886	2,555 250,642	860 174,451	6,830 841,237	3,280 697,298	8,284 4,323,902	7,132 2,903,920		9,848 4,153,019		5,621 2,152,942	6,530 8,837,645
Angler-hours Fished Estimate Variance	1,779 497,461	3,233 177,196	4,586 961,175	4,623 3,954,634	45,887 2,832,013	10,049 9,328,957	25,321 26,905,476	18,123 15,882,325	13,713 10,509,520	22,014 13,616,174	32,105 36,342,400	22,487 27,518,032	21,858 57,763,138
Soat-days Fished Estimate Variance	285 9,151	455 7,148	505 11,377	642 42,772		875 51,149	2,383 114,525	1,667 74,328	1,378 73,137	1,660 55,864		1,849 172,789	1,660 394,794
_arge Chinook Salmon Harvested Estimate Variance _arge Chinook Salmon	11 119	45 1,190	45 692	83 2,354	1,528 108,991	301 22,946	919 66,089	643 63,519		186 7,361		26 173	550 176,768
Released Estimate Variance Small Chinook Salmon	0	0	0	0	142 27,582	0	7 39	0		0		0	0
Harvested Estimate Variance Small Chinook Salmon	0	0		0	80 3,342	19 324	39 310	53 720		117 12,588		11 105	0
Released Estimate Variance	0	23 0	63 2,005	180 4,934	1,915 82,209	354 44,576	821 57,899	1,765 394,739		1,613 100,389		4,239 2,651,896	1,696 401,416
oho Salmon Harvested Estimate Variance	0	0	0	0	14 64	8 62	93 946	301 11,802		422 8,645		2,269 295,970	1,106 194,396
oho Salmon Released Estimate Variance	0	0	0	0	17 209	0	0			231 12,100		1,057 135,429	475 84,695
hum Salmon Harvested Estimate Variance	0	0		0	0	25 575	71 868	154 4,002		55 440		97 1,336	108 2,275
Chum Salmon Released Estimate Variance	0	0	0	0	0	0	0	12 139		0	0	0	

Appendix Table 2. Estimated effort and catches for the Ketchikan marine boat sport fishery by seasonal period, 11 April - 25 September 1988 (Continued).

						Sea	sonal Perio	od					
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby 1	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Sockeye Salmon													
Harvested Estimate	0	0	0	0	0	0	0	28 728	12 128	23 240	5 23	0	12 141
Variance Sockeye Salmon Released	0	-				-	_			-			
Estimate Va riance	0	0	0	0	0 0	0	0	0	0	47 1,914	0	0	0 0
Pink Salmon Harvested Estimate	0	0	0	0	0	0	38	396	866	4,351	4,515	1,925	247
Variance Pink Salmon Released	0	0	0	0	0	0	360	6,660	97,032	1,360,491	1,996,759	242,427	32,018
Estimate	0	0	0	0	0	0	25 609	32 606	169 6,980	1,226 401,759	1,127 223,647	661 62,420	234 15,109
Variance Pacific Halibut	U	U	U	U	U	U	009	000	0,300	401,733	223,047	02,420	15,105
Harvested Estimate	94	35	40	55	714	267	1,028	789	402	960	1,456	738	738
Variance Pacific Halibut	1,273	431	811	587	58,307	7,791	79,364	40,705	51,322	59,806	135,891	85,663	158,596
Released Estimate	0	0	18	14	307	0	175	159	33	244	253	85	49
Variance Steelhead Harvested	Ō	Ó	284	172	6,650	0	4,334	6,198	590	13,545	7,667	2,202	695
Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance Steelhead Released	_	-		0	-		0	0	0	0	0	0	0
Estimate Variance	0	0	0	0	0	0	0	ő	Ö	ŏ	ő	ŏ	ő
Outthroat Trout Harvested Estimate	9 0	0	0	0	0	0	0	0	0	0	0	0	0
Variance Cutthroat Trout Released	0	0	0	0	0	0	0	0	0	0	0	0	0
Estimate Variance	0	0	0	0	0	0	0	0	0	0	16 222	0	0
Oolly Varden Harvested Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	. 0	Ŏ	ő	Ŏ	Ŏ
Oolly Varden Released Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance Ling Cod Harvested	0	0	0	•	•	•	_	•	•	-	_	_	-
Estimate Variance	11 119	37 1,268	33 359	55 1,505	170 1,061	63 2,362	159 3,173	74 535	120 2,413	81 1,192	52 392	20 144	57 2,256
Ling Cod Released Estimate	0	0	13	0	28	0	0	28	0	6	27	29	12
Variance Kelp Greenling	0	0	167	0	2,163	0	0	727	0	27	315	443	137
Harvested Estimate	26	19	16	0	7	0	0	0	0	0	0	0	0
Variance	318	317	107	ŏ	61	ŏ	ŏ	ŏ	ō	Ŏ	Ö		ō
Celp Greenling Released Estimate	ó	0	13	0	0	0	0	0	0	0	0	0	0
Variance Unidentified Rockfish	0	0	129	0	0	0	0	0	0	U	U	U	U
Harvested Estimate	156	372	127	28	442	525	1,620	927	1,858	734	1,435	448	200
Variance Black Rockfish	12,994	30,480	3,843	710	85,859	175,618	440,104	64,001	752,736	45,830	217,348	17,594	11,731
Harvested Estimate	0	0	13	0	28	0	6	23	0	47	25	67	12
Variance	ŏ	ŏ	142	ŏ	602	ŏ	32	469	Ŏ	1,318	330	3,001	137

Appendix Table 2. Estimated effort and catches for the Ketchikan marine boat sport fishery by seasonal period, 11 April - 25 September 1988 (Continued).

						Sea	sonal Perio	pd					
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby ¹	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Boccacio Harvested													
Estimate													
Variance													
Copper Rockfish													
Harvested					_							_	_
Estimate	0	0	0	14	0	117	37	58	101	16 93	40	o	o
Variance	0	0	0	178	0	12,075	628	1,855	4,592	93	1,374	0	0
Dusky Rockfish													
Harvested													
Estimate	37	0	13	0	7	o	15	134	Ó	82	Ō	92	Ó
Variance	682	0	172	0	4	0	103	11,427	0	1,159	0	6,651	0
Quillback Rockfish													
Harvested													
Estimate	90	214	128	96	747	372	599	736	305	262	240	217	84
Variance	1,126	1,576	10,995	5,853	584,422	47,830	131,929	147,689	22,812	5,658	11,701	22,546	2,583
Silvergrey Rockfish													
Harvested													
Estimate	30	0	27	110	14	33	39	51	10	156	16	52	12
Variance	818	0	689	5,855	2,275	986	779	410	82	6,343	94	1,710	137
Yelloweye Rockfish													
Harvested													
Estimate	43	115	51	0	197	113	220	327	228	179	285	242	122
Variance	515	7,557	2,730	0	5,301	4,079	12,568	7,003	10,184	6,186	19,405	14,812	11,266
rellowtail Rockfish													
Harvested													
Estimate	0	0	9	0	14	0	0	9	0	17	0	20	0
Variance	0	0	71	0	358	0	0	66	0	241	0	313	0
Other Rockfish													
Harvested													
Estimate	11	0	20	0	0	151	71	121	26	92	219	34	42
Variance	113	Ö	188	Ó	0	17,602	2,847	4,197	375	2,412	32,684	237	479
11 Rockfish Harvested		-			-		•	-		•	•		
Estimate	367	701	388	248	1,450	1,312	2,607	2,387	2,529	1,584	2,260	1,172	472
Variance	21.064	48,999	13,632	24,850	678,821	414,640	791,243	578,140	896,744	112,043	651,708	197,681	76,823
All Rockfish Released	,	,	,		,	- 1,4 14		-,		-,	-,	. ,	-,
Estimate	511	372	564	336	3,628	353	2,209	1,931	931	1,592	1,497	942	650
Variance	64,390	46,496	42,814	32,036	335,540	20,782	645,861	323,672	65.045	250,453	72,241	27,153	152,472

Derby held on weekends of 28-30 May, 4-5 June, and 11-12 June 1988.

Appendix Table 3. Estimated effort and catches for the Petersburg marine boat sport fishery, 11 April - 17 July 1988.

	APPROXIMATE		APPROXIMATE
	95% C.I. LOWER		95% C.I. UPPER
	LIMIT	ESTIMATE	LIMIT
Boat-hours Fished	11,183	13,291	15,399
Salmon-hours Fished	20,270	24,952	29,634
Halibut-hours Fished	3,872	5,334	6,796
Ling cod-hours Fished	12	64	178
Rockfish-hours Fished	0	0	0
Bottomfish-hours Fished	3,935	5,398	6,861
Angler-hours Fished	25,313	30,421	35,529
Boat-days Fished	2,363	2,694	3,025
Large Chinook Salmon Harvested	1,154	1,905	1,975
Derby Take-home & Entered	_ <u></u> _	340	
Large Chinook Salmon Released	11	40	80
Small Chinook Salmon Harvested	3	31	44
Derby Take-home & Entered		11	
Small Chinook Salmon Released	331	574	818
Coho Salmon Harvested	0	0	0
Coho Salmon Released	0	0	0
Chum Salmon Harvested	2	9	26
Chum Salmon Released	0	0	0
Sockeye Salmon Harvested	0	0	0
Sockeye Salmon Released	0	0	0
Pink Salmon Harvested	0	0	0
Pink Salmon Released	0	0	0
Pacific Halibut Harvested	386	602	819
Pacific Halibut Released	338	658	983
Steelhead Harvested	0	0	0
Steelhead Released	0	0	0
Cutthroat Trout Harvested	4	14	50
Cutthroat Trout Released	0	0	0
Dolly Varden Harvested	14	77	155
Dolly Varden Released	2	8	23
Ling Cod Harvested	5	2.7	74
Ling Cod Released	0	0	0
Kelp Greenling Harvested	1	6	17
Kelp Greenling Released	0	0	0
All Rockfish Harvested	6	38	84
All Rockfish Released	0	0	0

Appendix Table 4. Estimated effort and catches for the Petersburg marine boat sport fishery by seasonal period, 11 April - 17 July 1988.

				Seasonal Pe				
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby 1	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88
Number of Samples	20	20	20	12	. 8		20	18
Number of Boats Counted	36	47	59	68	135	97	82	37
Number of Boats	20	47	59	68	135	97	82	37
Interviewed	36 70	69	70	42	28		69	63
Hours Sampled Hours Available to	70	09	70	42	20	70	03	0.
Sample	406	427	441	326	98	462	462	462
Boat-hours Fished	400	,_,						
Estimate	556	886	1,529	2,070	3,271	2,153	1,851	976
Variance	13,134	37,338	30,316	204,316	129,181		94,248	8,407
Salmon-hours Fished								
Estimate	830	1,457	2,048	4,809	7,473		3,304	1,099
Variance	42,908	111,445	94,331	1,042,469	692,629	575,291	348,689	61,104
Halibut-hours Fished								
Estimate	144	274	1,324	276	198		1.344	1,230
Variance	1,844	18,321	113,103	37,364	4,875	45,312	157,427	63,716
Ling cod-hours Fished		•	0	0	0	0	0	64
Estimate	0	0	ŏ	Ö	. 0		ŏ	3,287
Variance Rockfish-hours Fished	U	U	U	U	U	U	v	3,207
Estimate	0	0	0	0	0	0	0	C
Variance	ŏ	ŏ	ŏ	ŏ	ŏ		ŏ	č
Bottomfish-hours Fished	ū	•	•	•	•	-	•	-
Estimate	144	274	1,324	276	198	545	1,344	1,293
Variance	1,844	18,321	113,103	37,364	4,875	45,312	157,427	64,720
Angler-hours Fished	-,		•	-	•	-		
Estimate	1,001	1,730	3,394	5,084	7,671		4,648	2,413
Variance	55,384	177,294	265,493	1,172,172	735,984	457,594	605,077	144,346
Boat-days Fished								
Estimate	164	282	407	530		574	453	283
Variance	855	2,654	2,249	10,816		4,859	4,416	1,585
Large Chinook Salmon Harvested	_			500	240	202	204	50
Estimate	.4	51	149	583	340		364	448
Variance	13	309	1,314	12,357		1,878	25,842	440
Large Chinook Salmon Released	0	0	0	4	36	0	0	(
Estimate	0	0	ŏ	11	281		ŏ	č
Variance Small Chinook Salmon Harvested	ŭ	J	Ū		201	•	•	•
Estimate Estimate	0	0	0	4	11	12	4	c
Variance	ő	ŏ	ŏ	11			12	Č
Small Chinook Salmon Released	_							
Estimate	0	0	48	59	101	188	156	22
Variance	Ö	Ó	287	807	647	1,175	6,837	155
Coho Salmon Harvested								
Estimate	0	0	0	0	0		0	C
Variance	0	0	0	0	0	0	0	C
Coho Salmon Released	_	_	_	_	_			
Estimate	ō	0	0	0	0		0	ç
Variance	0	0	0	0	0	0	0	C
Chum Salmon Harvested		•		•	0	0	9	c
Estimate	0	0	0	0	0		70	č
Variance	0	0	0	0	U	Ü	70	,
Chum Salmon Released	_	^	0	0	0	0	0	c
Estimate	0	0	Ü	ŏ	0		ő	č
Variance	U	U	U	U	U	U	U	

Appendix Table 4. Estimated effort and catches for the Petersburg marine boat sport fishery by seasonal period, 11 April - 17 July 1988 (Continued).

				Seasonal Pe	riod			
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby ¹	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 17JUL88
Sockeye Salmon Harvested				0	0	0	0	
Estimate	0	0	0	ŏ	ŏ		ŏ	
Variance	U	v	v	v	·	•	•	
Sockeye Salmon Released Estimate	0	0	0	0	0	0	0	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ		ŏ	
Pink Salmon Harvested	J	•	•					
Estimate	0	0	0	0	0	0	0	
Variance	ō	Õ	Ó	0	0	0	0	
Pink Salmon Released	_	•						
Estimate	0	0	0	0	0	0	0	
Variance	ō	Ŏ	Ó	0	0	0	0	
Pacific Halibut Harvested	•	•						
Estimate	48	21	105	31	47	37	119	19
Variance	539	130	1,661	259	260	181	1,806	3,91
Pacific Halibut Released			-,					
Estimate	15	60	109	19	7	26	184	23
Variance	60	543	1,007	280	27	215	5,923	16,72
Steelhead Harvested			- *					
Estimate	0	0	0	0	0		0	
Variance	Ó	0	0	0	0	0	0	
Steelhead Released	_							
Estimate	0	0	0	0	0		0	
Variance	0	0	0	0	0	0	0	
Cutthroat Trout Harvested								
Estimate	0	0	0	0	14		0	
Variance	0	0	0	0	321	0	0	
Cutthroat Trout Released								
Estimate	0	0	0	0	o		0	
Variance	0	0	0	0	Ō	0	0	
Dolly Varden Harvested								
Estimate	8	8	14	0	11		0	_ ;
Variance	55	24	79	0	32	18	0	91
Oolly Varden Released								
Estimate	8	0	0	0	0		0	
Variance	55	0	0	0	0	0	0	
Ling Cod Harvested								
Estimate	0	0	0	0	0		Ō	_2
Variance	0	0	0	0	0	0	0	57
Ling Cod Released								
Estimate	0	0	0	0	0		0	
Variance	0	0	0	0	0	0	0	
Kelp Greenling Harvested								
Estimate	0	0	0	0	0		0	
Variance	0	0	0	0	0	0	0	
(elp Greenling Released								
Estimate	0	0	0	0	0		0	
Variance	Ó	0	0	0	0	0	0	
All Rockfish Harvested	_							
Estimate	0	0	11	0	0		0	2
Variance	Ö	ŏ	115	Ö	0	0	0	39
All Rockfish Released	_	•		-				
Estimate	0	0	0	0	0		0	
Variance	ő	ŏ	Ŏ	ō	ō		0	

Derby held on 28-30 May weekend.

Appendix Table 5. Estimated effort and catches for the Wrangell marine boat sport fishery, 11 April - 17 July 1988.

	APPROXIMATE 95% C.I. LOWER		APPROXIMATE 95% C.I. UPPER
	LIMIT	ESTIMATE	LIMIT
Boat-hours Fished	12,658	14,888	17,119
Salmon-hours Fished	24,591	29,486	34,381
Halibut-hours Fished	3,737	5,097	6,457
Ling cod-hours Fished	0	0	0
Rockfish-hours Fished	0	0	0
Bottomfish-hours Fished	3,737	5,097	6,457
Angler-hours Fished	29,388	34,583	39,778
Boat-days Fished	2,540	2,977	3,414
Large Chinook Salmon Harvested	1,211	1,535	1,860
Large Chinook Salmon Released	19	84	180
Small Chinook Salmon Harvested	0	0	0
Small Chinook Salmon Released	112	195	277
Coho Salmon Harvested	6	26	71
Coho Salmon Released	0	0	0
Chum Salmon Harvested	1	8	22
Chum Salmon Released	0	0	0
Sockeye Salmon Harvested	0	0	0
Sockeye Salmon Released	0	0	0
Pink Salmon Harvested	17	128	342
Pink Salmon Released	30	231	657
Pacific Halibut Harvested	362	542	722
Pacific Halibut Released	5	21	48
Steelhead Harvested	0	0	0
Steelhead Released	0	0	0
Cutthroat Trout Harvested	0	0	0
Cutthroat Trout Released	0	0	0
Dolly Varden Harvested	0	0	0
Dolly Varden Released	0	0	0
Ling Cod Harvested	0	0	0
Ling Cod Released	0	0	0
Kelp Greenling Harvested	0	0	0
Kelp Greenling Released	0	0	0
All Rockfish Harvested	9	65	139
All Rockfish Released	0	0	0

Appendix Table 6. Estimated effort and catches for the Wrangell marine boat sport fishery by seasonal period, 11 April - 17 July 1988.

			Sea	sonal Perio	d		
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88
Number of Samples	20	20	20	20	20	18	20
Number of Boats Counted	26	52	143	148	45	36	42
Number of Boats							
Interviewed	26	51	143	144	45	36	42 71
Hours Sampled	71	71	72	72	70	64	/1
Hours Available to					570		
Sample	508	525	543	560	578	578	569
Boat-hours Fished	500	1 000	4 201	4 012	1 677	1,230	1,117
Estimate	522	1,229	4,301	4,812	1,677 169,624	46,450	48,058
Variance	10,897	55,035	367,754	546,071	169,624	46,430	40,050
Salmon-hours Fished	447	2 226	9,770	10,755	3,216	1,459	1,502
Estimate	447	2,336		2,865,241	642,381	185,006	438,482
Variance	19,888	247,370	1,591,180	2,000,241	042,301	100,000	-30,402
Halibut-hours Fished	570	356	0	13	1,037	1,618	1,501
Estimate	572		ŏ	119	213,627	113,652	85,113
Variance	21,291	28,599	U	119	213,027	113,032	05,115
Ling cod-hours Fished	0	0	0	O	0	0	C
Estimate	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	č
Variance	U	v	U	U	v	v	•
Rockfish-hours Fished	0	0	0	0	0	0	0
Estimate	ő	0	ŏ	ŏ	ŏ	ŏ	ŏ
Variance Bottomfish-hours Fished	U	Ū	v	v	·	v	~
Estimate	572	356	0	13	1,037	1,618	1,501
Variance	21,291	28,599	ŏ	119	213,627	113,652	85,113
Angler-hours Fished	21,231	20,333	•		210,027	,	,
Estimate	1.019	2,692	9,770	10,768	4,253	3,077	3,003
Variance	37,557	283,679	1,591,180	2,848,980	1,167,483	317,278	501,284
Boat-days Fished	37,337	200,075	1,001,100	2,040,500	1,107,100	01, ,2, 0	
Estimate	148	263	809	826	412	. 254	264
Variance	933	2,757	8,006	15,400	17,201	1,814	1,569
Large Chinook Salmon Harvested	555	-,	-,	,		-,	•
Estimate	0	114	485	561	201	67	108
Variance	ŏ	670	5,658	9,160	5,427	981	4,397
Large Chinook Salmon Released	J		-,	-,			•
Estimate	0	0	13	71	0	0	(
Variance	ō	Ō	147	2,152	0	0	0
Small Chinook Salmon Harvested				,			
Estimate	0	0	0	0	0	0	(
Variance	C	0	0	0	0	0	0
Small Chinook Salmon Released							
Estimate	0	30	41	108	7	9	C
Variance	0	188	165	1,245	42	66	C
Coho Salmon Harvested							
Estimate	0	0	0	0	0	0	26
Variance	0	0	0	0	0	0	514
Coho Salmon Released							
Estimate	0	0	0	0	0	0	Q
Variance	0	0	0	0	0	0	C
Chum Salmon Harvested							
Estimate	0	0	0	0	0	Ō	
Variance	0	0	0	0	0	0	51
Chum Salmon Released							
Estimate	0	0	0	0	0	0	9
Variance	0	0	0	0	0	0	0

Appendix Table 6. Estimated effort and catches for the Wrangell marine boat sport fishery by seasonal period, 11 April - 17 July 1988 (Continued).

			Sea	sonal Perio	d		
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	06JUN88 - 19JUN88	20JUL88 -	04JUL88 17JUL88
Sockeye Salmon Harvested						_	.,
Estimate	0	o	Ō	Ō	0	0	
Variance	0	0	0	0	0	0	
ockeye Salmon Released	_	_	_	_	_	_	
Estimate	Ō	0	0	0	0	0	
Variance	0	0	0	0	0	0	
ink Salmon Harvested	_	_	_	_	_	_	
Estimate	ō	0	0	0	0	9	12
Variance	0	0	0	0	0	68	11,39
ink Salmon Released	_	_	_	_	_	_	
Estimate	ō	0	0	0	0	0	2
Variance	0	0	0	0	0	0	45,5
cific Halibut Harvested							_
Estimate	59	42	13	56	107	116	1:
Variance	700	430	56	280	1,285	2,419	2,9
cific Halibut Released							
Estimate	0	0	0	8	0	0	
Variance	0	0	0	54	0	0	1.
eelhead Harvested							
Estimate	0	0	0	0	0	0	
Variance	0	0	0	0	0	0	
eelhead Released							
Estimate	0	0	0	0	0	0	
Variance	0	0	0	0	0	0	
utthroat Trout Harvested							
Estimate	0	0	0	0	0	0	
Variance	Ó	0	0	0	0	0	
utthroat Trout Released	•						
Estimate	0	0	0	0	0	0	
Variance	Ŏ	Ō	Ō	Ó	Ō	. 0	
olly Varden Harvested	v	-	-	-	•	-	
Estimate	0	0	0	0	0	0	
Variance	ŏ	ō	ŏ	ŏ	ŏ	ō	
olly Varden Released	v	J	·	v	•	•	
Estimate	0	0	0	0	0	0	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	
ing Cod Harvested	v	•	J	•	•	•	
Estimate	0	0	0	0	0	0	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	
ing Cod Released	ŭ	v	Ū	v	•	•	
Estimate	0	0	0	0	0	0	
Variance	ő	ŏ	ŏ	ŏ	ŏ	ŏ	
	J	U	U	U	U	Ū	
elp Greenling Harvested	0	0	0	0	0	0	
Estimate	ů n	0	ő	ő	ő	ö	
Variance	U	U	U	U	U	U	
elp Greenling Released	•	•	^	^	^	٠ ٥	
Estimate	0	0	0	0	0	Ö	
Variance	0	0	0	0	U	U	
	_	_		_	_		
Estimate	o	0	13	0	0	53	
Variance	0	0	127	0	0	1,211	
11_Rockfish Released	_	_	_	_	_	_	
Estimate	ō	0	0	0	0	0	
Variance	0	0	0	0	0	0	

Appendix Table 7. Estimated effort and catches for the Sitka marine boat sport fishery, 11 April - 25 September 1988.

	APPROXIMATE 95% C.I. LOWER		APPROXIMATE 95% C.I. UPPER
	LIMIT	ESTIMATE	LIMIT
Boat-hours Fished	20,141	23,727	27,314
Salmon-hours Fished	28,973	35,763	42,552
Halibut-hours Fished	13,673	17,123	20,572
Ling cod-hours Fished	32	271	591
Rockfish-hours Fished	312	1,099	1,886
Bottomfish-hours Fished	14,700	18,493	22,286
Angler-hours Fished	45,992	54,766	63,539
Boat-Days Fished	4,901	5,715	6,529
Large Chinook Salmon Harvested	2,446	3,160	3,874
Derby Take-home	60	144	227
Derby Entered		608	
Derby Take-home & Entered	668	752	835
Large Chinook Salmon Released	6	43	121
Small Chinook Salmon Harvested	11	17	30
Derby Take-home	0	0	0
Derby Entered		10	
Derby Take-home & Entered	10	10	10
Small Chinook Salmon Released	915	1,401	1,887
Coho Salmon Harvested	382	616	850
Coho Salmon Released	11	107	207
Chum Salmon Harvested	55	312	570
Chum Salmon Released	33	333	861
Sockeye Salmon Harvested	0	0	0
Sockeye Salmon Released	0	0	0
Pink Salmon Harvested	106	218	331
Pink Salmon Released	22	163	360
Pacific Halibut Harvested	5,218	6,923	8,628
Pacific Halibut Released	3.944	5,962	7,980
Steelhead Harvested	0	0	0
Steelhead Released	0	0	0
Cutthroat Trout Harvested	0	0	0
Cutthroat Trout Released	0	0	0
Dolly Varden Harvested	40	319	718
Dolly Varden Released	31	234	478
Ling Cod Harvested	650	955	1,260
Ling Cod Released	69	616	1,163
Kelp Greenling Harvested	18	218	445
Kelp Greenling Released	29	253	485
Unidentified Rockfish Harvested	327	761	1,195
Black Rockfish Harvested	102	231	359
Boccacio Harvested	10	167	348
Copper Rockfish Harvested	6	43	80
Dusky Rockfish Harvested	5	52	108
Quillback Rockfish Harvested	331	723	1,116
Silvergrey Rockfish Harvested			
Yelloweye Rockfish Harvested	162	320	478
Yellowtail Rockfish Harvested	5	42	78
Other Rockfish Harvested	87	248	408
All Rockfish Harvested	1,864	2,587	3,309
TILL TOOKLADII MALTODOGA	*,007	13,500	16,994

Appendix Table 8. Estimated effort and catches for the Sitka marine boat sport fishery by seasonal period, 11 April - 25 September 1988.

								Seasor	nal Period				
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby ¹	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Number of Samples Number of Boats Counted	21 19	20 20	20 27	8 2	10 117	18 43	20 81	20 65	20 55	20 85	20 63	20 54	20 41
lumber of Boats Interviewed lours Sampled	19 72	20 68	27 67	2 27	116 35	43 62	79 68	65 68	55 68	85 69	63 69	54 68	41 63
lours Available to Sample Joat-hours Fished	1,033	1,068	1,103	693	376	938	714	693	683	651	620	599	557
Estimate Variance	525 24,034	983 142,349	1,281 255,772	81 6,203	6,051 1,327,809	2,376 474,271	2,513 217,605	2,128 247,371	1,604 106,250	2,33 4 167,255	1,723 155,982	1,210 72,485	918 18,574
almon-hours Fished Estimate Variance	252 25,106	380 54,007	1,258 305,047	0	14,296 7,605,751	3,728 1,252,048	4,200 698,595	2,556 715,989	1,481 90,508	2,619 245,177	2,697 357,604	1,358 141,859	938 32,739
alibut-hours Fished Estimate Variance	446 30,066	1,576 365,345	815 312,105	157 23,374	388 29,416	1,534 454,075	1,550 218,415	2,053 287,039	2,156 343,970	2,510 427,158	1,381 168,371	1,567 241,390	991 73,376
ing cod-hours Fished. Estimate Variance	0	0	0	0	19 222	0	0	156 22,179	0	27 348	53 2,638	16 203	0
ockfish-hours Fished Estimate Variance	64 3,909	70 4,602	477 112,793	0	70 12,878	29 767	53 1,479	84 2,574	3 10	229 15,7 5 8	3 9	3 6	12 136
ottomfish-hours Fished Estimate Variance	510 49,997	1,646 389,276	1,292 718,228	157 23,374	478 42,516	1,562 475,7 4 5	1,602 228,126	2,293 310,193	2,159 342,37 4	2,767 523,466	1,438 175,926	1,585 242,047	1,003 75,668
ngler~hours Fished Estimate Variance	915 59,424	2,026 635,119	2,559 1,193,662	157 23,374	14,804 8,281,456	5,290 2,974,203	5,964 1,564,511	4,849 1,469,549	3,668 562,264	5,386 1,020,763	4,262 816,889	2,943 533,668	1,941 107,122
oat-days Fished Estimate Variance	230 3,750	390 16,165	470 18,914	38 1,374		666 26,8 4 5	769 26,212	623 12,029	482 7,929	784 22,934	560 18,117	371 7,774	332 3,532
arge Chinook Salmon Harvested Estimate Variance	0	52 2,525	90 3,607	0	752 1,726	763 37,156	778 59,778	184 5,665	94 577	272 14,272	146 1,803	16 91	12 129
arge Chinook Salmon Released Estimate	0	0	0	0	0	0	0	Q	43	ō	ō	ō	ō
Variance Small Chinook Salmon Harvested	0	0	0	0	0	0	0	0	1,536	0	0	0	0
Estimate Variance mall Chinook Salmon	0 0	0	0	0	10 0	0	0	0	7 42	0	0	0	0
Released Estimate Variance	0	0	0	0	354 20,133	201 3,484	111 2,122	154 6,546	201 16,868	31 305	224 7,114	87 1,922	37 595
oho Salmon Harvested Estimate Variance	0	0	0	0	0	0	23 118	38 676	7 42	79 1,373	137 2,774	168 3,963	165 4,740
oho Salmon Released Estimate Variance	0	0	0	0	0	0	0	0	0	23 479	21 4 22	10 90	52 1,514
hum Salmon Harvested Estimate Variance	0	0	0	0	0	15 222	0	0	19 175	165 13,484	82 2,433	10 90	21 201
hum Salmon Released Estimate Variance	0	0	0	0	0	0	0	0	0	272 68,892	34 563	26 348	0

Appendix Table 8. Estimated effort and catches for the Sitka marine boat sport fishery by seasonal period, 11 April - 25 September 1988 (Continued).

								Seasor	nal Period				
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby ¹	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Sockeye Salmon Harvested					0	0	0	0	0	0	0	0	0
Estimate Variance	0 0	0	0	0 0	0	ő	0	0	0	ŏ	ő	ŏ	ŏ
Sockeye Salmon Released Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance	Ö	ō	ō	Ŏ	0	0	0	0	0	0	0	0	0
ink Salmon Harvested Estimate	0	0	0	0	0	0	38	33 956	19 172	63 827	41 551	25 275	0
Variance ink Salmon Released	0	0	Ó		0	0	391						•
Estimate Variance	0	0	0	0	0	0	0	98 7,880	12 131	0	11 106	0	42 1,642
acific Halibut	·	-		_	-								
Harvested Estimate	34	46	71	0	188	878	815	1,201	713	1,574 239,416	738	455 21,270	209 10,919
Variance Pacific Halibut	390	492	1,386	0	3,872	104,281	101,075	124,546	46,683	239,416	72,352	21,270	10,919
Released Estimate	0	13	0	0	69	1.015	567	1,033	496	1,702	454	327	285
Variance	Ö	158	Ō	Ō	1,535	162,317	116,461	201,201	27,101	399,830	44,390	15,919	49,091
teelhead Harvested Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance teelhead Released	0	0	0	0	0	0	_	•	•	•	_	_	
Estimate Variance	0	0	0	0	0	0	0	0	0	0	0	0	0
utthroat Trout Harvested		0	0	0	0	0	0	a	0	0	0	0	0
Estimate Variance	ŏ	ő	ŏ	ŏ	ŏ	ŏ	ŏ	ő	ō	ŏ	ō	Ō	Ó
utthroat Trout Released Estimate	0	0	0	0	0	0	0	0	0	Ō	0	0	0
Variance Olly Varden Harvested	0	0	0	0	0	0	0	0	. 0	0	0	0	0
Estimate	0	0	0	0	10 617	0	310 39,159	0	0	0	0	0	0
Variance olly Varden Released	-	-		•		-		0	0	0	0	0	0
Estimate Variance	0	0	0	0	19 87	0	215 14,777	0	ő	ŏ	0	ŏ	ŏ
ing Cod Harvested Estimate	39	46	68	0	140	12	97	95	61	199	73	76	48
Variance	1,537	1,186	2,334	ŏ	2,431	152	1,497	4,230	1,199	4,328	1,750	1,985	607
ing Cod Released. Estimate	0	o	94	0	165	230	.8	18	7 42	66	24 244	5 22	0
Variance (elp Greenling Harvested	0	0	4,365	0	30,984	37,587	53	100		1,375			-
Estimate Variance	0	78 5,680	0	38 1,374	0	0	0	6 31	0	79 5,692	11 106	5 23	0
elp Greenling Released	0	0,000	0	0	5	43	8	119	26	0	0	31	21
Estimate Variance	0	ő		ő	14	1,726		10,574	300	ŏ	ŏ	333	410
Inidentified Rockfish Harvested												_	_
Estimate Variance	26 603	191 17,462	125 6,681	0	86 1,209	101 4,794	0	0	160 15,327	68 989	0	5 23	0
lack Rockfish	403	17,402	0,501	Ů	2,205	.,,,,,,	•	·					
Harvested Estimate	0	30		0	15	0		18	7	72	0	10 36	33 521
Variance	0	415	0	0	70	0	1,317	307	42	1,398	U	30	221

Appendix Table 8. Estimated effort and catches for the Sitka marine boat sport fishery by seasonal period, 11 April - 25 September 1988 (Continued).

								Seasor	al Period				
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	Derby ¹	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Boccacio Harvested							_	_	_			•	•
Estimate	0	67	48	Ō	o	43	0	9 77	0	0	0	0	0
Variance	0	4,113	2,252	0	0	1,726	0	//	U	U	U	U	U
Copper Rockfish													
Harvested						_	_				_	^	_
Estimate	0	0	0	0	0	Ō	0	11	14 85	.11	0	0	.6
Variance	0	0	0	0	0	0	0	106	85	120	0	0	34
Dusky Rockfish													
Harvested								_	_		_	^	•
Estimate	0	0	0	0	5	o.	25	Ō	0	23	0	0	0
Variance	0	0	0	0	14	0	564	0	0	190	0	Ü	0
Quillback Rockfish													
Harvested													_
Estimate	79	34	202	38	34	74	38	92	68	46	13 143	0	_6
Variance	6,148	1,054	16,810	1,374	2,008	5,001	1,269	1,997	1,548	1,194	143	0	32
Silvergrey Rockfish													
Harvested													
Estimate													
Variance													
Yelloweve Rockfish													
Harvested									_				_
Estimate	0	33	0	19	15	81	45	24	.7	25	32	33	6 32
Variance	0	1,028	0	343	472	2,329	838	339	42	274	268	286	32
Yellowtail Rockfish		•											
Harvested							_	_	_			-	•
Estimate	0	0	0	0	0	0	8	0	0	18	.11	.5	0
Variance	0	0	0	0	0	0	53	0	0	154	103	22	U
Other Rockfish													
Harvested												_	
Estimate	0	0	0	0	0	0	12	64	81	_57	17	. 5	11
Variance	0	0	0	0	0	0	145	2,046	2,438	1,543	142	23	103
All Rockfish Harvested													
Estimate	104	354	375	57	154	299	173	219	337	320	73	_59	63
Variance	6,751	29,002	30,364	3,091	3,773	8,864	5,232	15,939	14,471	11,138	655	543	699
All Rockfish Released	-											242	044
Estimate	66	712	402	571	3,697	2,169	1,237	1,065	922	943	1,128	343	244
Variance	4,269	292,251	47,168	309,082	729,002	1,078,208	45,534	105,693	76,119	93,597	167,831	9,092	8,218

Derby held on weekends of 28-30 May and 4-5 June 1988.

Appendix Table 9. Estimated effort and catches for the Juneau marine boat sport fishery, 11 April - 25 September 1988.

	APPROXIMATE		APPROXIMATE
	95% C.I. LOWER LIMIT	ESTIMATE	05% C.I. UPPER LIMIT
Boat-hours Fished	121,539	134,271	147,002
Salmon-hours Fished	223,141	254,196	285,251
Malibut-hours Fished	86,034	96,188	106,341
ing cod-hours Fished	0	0	0
Rockfish-hours Fished	0	0	0
Sottomfish-hours Fished	86,034	96,188	106,341
Angler-hours Fished	316,192	351,247	386,302
Boat-Days Fished	25,607	27,801	29,995
arge Chinook Salmon Harvested	4,571	5,344	6,117
Derby Take-home	17	88	204
Derby Entered		549	
Derby Take-home & Entered	566	637	753
arge Chinook Salmon Released	2	10	19
Small Chinook Salmon Harvested	196	339	482
Derby Take-home	4	21	126
Derby Entered		19	
Derby Take-home & Entered	23	40	145
Small Chinook Salmon Released	3,618	4,721	5,825
Coho Salmon Harvested	10,597	12,017	13,437
Derby Take-home	151	354	557
Derby Entered	~ ~ *	1,099	
Derby Take-home & Entered	1,250	1,453	1,656
Coho Salmon Released	140	237	334
Chum Salmon Harvested	1,032	1,328	1,625
Derby Take-home	26	73	120
Derby Entered		131	
Derby Take-home & Entered	157	204	251
Chum Salmon Released	24	74	125
Sockeye Salmon Harvested	7	20	35
Derby Take-home	0	0	0
Derby Entered		5	-++
Derby Take-home & Entered	5	5	5
	0	0	0
Sockeye Salmon Released Pink Salmon Harvested	3,848	4,798	5,749
	5,646		213
Derby Take-home		135	213
Derby Entered		360	573
Derby Take-home & Entered	418	495	
Pink Salmon Released	690	1,044	1,399
Pacific Halibut Harvested	11,065	12,672	14,279
Pacific Halibut Released	4,047	5,027	6,006
Steelhead Harvested	0	0	0
Steelhead Released	0	0	0
Cutthroat Trout Harvested	1	9	27
Cutthroat Trout Released	0	0	0
Dolly Varden Harvested	808	1,509	2,210
Dolly Varden Released	304	482	660
Ling Cod Harvested	1	8	23
Ling Cod Released	0	0	0
Kelp Greenling Harvested	1	5	15
Kelp Greenling Released	0	0	0
All Rockfish Harvested	666	967	1,269
All Rockfish Released	64	193	322

Appendix Table 10. Estimated effort and catches for the Juneau marine boat recreational fishery by seasonal period, 11 April - 25 September 1988.

						Se	easonal Peri	od					
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	Derby ¹	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88
Number of Samples Number of Boats Counted	48 98	49 116	60 178	60 318	60 214	60 355	60 469	60 450	30 166	13 547		60 307	60 160
Number of Boats Interviewed Hours Sampled	97 158	116 163	178 201	318 201	212 200	354 202	468 202	449 201	165 100	547 113	414 202	307 202	160 186
dours Available to Sample	1,962	2,152	2,352	2,426	2,499	2,499	2,462	2,389	1,811	528	2,168	2,095	1,948
Boat-hours Fished Estimate Variance	2,015 75,917	4,452 931,247	5,052 1,156,935	10,526 1,773,069	8,479 1,102,623	14,117 2,871,018	16,305 2,488,708	15,950 1,847,020	9,623 2,320,234	21,207 20,867,334	14,668 3,533,536	7,748 1,278,913	4,128 275,255
Salmon-hours Fished Estimate Variance	4,115 342,174	6,996 856,091	9,323 4,598,510	16,767 4,877,693	15,062 4,476,313	20,708 6,183,807	23,696 6,357,192	27,745 5,972,350	19,615 13,540,456	57,041 153,224,252	32,340 36,214,747	14,635 3,456,115	6,155 997,372
dalibut-hours Fished Estimate Variance	660 43,164	2,671 3,424,253	1,610 173,336	6,983 1,726,631	7,425 1,933,173	15,878 4,575,852	18,491 3,620,872	17,535 5,120,017	8,147 2,146,247	1,647 553,328	6,509 782,958	4,242 685,382	4,388 988,023
ing cod-hours Fished Estimate Variance	0	0	0	0	0	0	0	0	0	0		0	0 0
Rockfish-hours Fished Estimate Variance	0 0	0	0	0	0	0	0	0	0	0		0	0 0
Bottomfish-hours Fished Estimate Variance	660 43,164	2,671 3,424,253	1,610 173,336	6,983 1,726,631	7,425 1,933,173	15,878 4,575,852	18,491 3,620,872	17,535 5,120,017	8,147 2,146,247	1,647 553,328	6,509 782,958	4,242 685,382	4,388 988,023
Angler-hours Fished Estimate Variance	4,938 448,954	9,788 3,910,305	11,314 5,720,911	23,771 8,068,841	22,519 9,622,662	36,630 16,717,278	42,270 14,860,417	45,299 16,892,902	27,762 18,560,589	58,688 161,816,065	38,849 41,632,197	18,878 6,600,531	10,543 2,366,950
Boat-days Fished Estimate Variance	616 7,154	1,113 28,610	1,403 86,864	2,383 91,319	1,844 43,381	3,297 174,539	4,229 155,623	3,726 93,782	2,235 108,978		3,504 253,970	2,237 120,321	1,215 39,219
arge Chinook Salmon Harvested Estimate Variance arge Chinook Salmon	13 36	213 4,521	237 4,548	247 1,891	419 9,017	605 13,205	700 9,581	1,249 37,557	341 29,405	637 3,332	486 33,663	120 1,424	75 1,069
Released Estimate Variance Gmall Chinook Salmon	0	0	0	0	0	0	0	0	0	5 5	4 15	0	0
Harvested Estimate Variance Small Chinook Salmon	0	0	9 71	21 142	42 487	15 55	32 193	52 595	41 428	40 2,747	7 15	55 144	24 240
Released Estimate Variance	0	21 140	42 349	186 5,654	282 13,364	291 3,536	527 10,502	1,087 30,437	430 18,960	958 192,108		176 1,358	129 3,436
Coho Salmon Harvested Estimate Variance	0 0	0	0	0	0	86 1,571	539 5,219	1,369 17,536	1,916 114,856	1,453 10,335		1,882 101,308	248 3,294
Coho Salmon Released Estimate Variance	0	0	0 0	0	0	0	29 440	29 231	16 237	36 128	69 492	23 99	35 713
Chum Salmon Harvested Estimate Variance	0	0	0	0	0	266 4,141	222 3,752	332 10,872	103 889	204 558	149 1,430	34 193	19 94
Chum Salmon Released Estimate Variance	0	0	0	0	0	12 54	9 73	21 123	0	16 302		17 81	0

Appendix Table 10. Estimated effort and catches for the Juneau marine boat recreational fishery by seasonal period, 11 April - 25 September 1988.

	Seasonal Period													
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 22MAY88	23MAY88 - 05JUN88	06JUN88 - 19JUN88	20JUN88 - 03JUL88	04JUL88 - 17JUL88	18JUL88 - 31JUL88	01AUG88 - 14AUG88	Derby ¹	15AUG88 - 28AUG88	29AUG88 - 11SEP88	12SEP88 - 25SEP88	
Sockeye Salmon														
Harvested Estimate	0	0	0	0	0	8	7	0	0	5	0	0	0	
Variance	ŏ	Ō	Ō	Ó	Ō	30	27	0	0	0	0	0	0	
Sockeye Salmon														
Released Estimate	0	a	0	0	0	0	0	0	0	0	0	0	0	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ō	ŏ	Ŏ	Ŏ	Ō	ō	
ink Salmon Harvested	_	_	_				014	1 040	1 010	495	829	101	0	
Estimate Variance	0	0	0	0	0	208 6,235	914 28,083	1,242 109,468	1,010 66,757	1,507	12,635	1,165	0	
ink Salmon Released	· ·	U	v	·	•	0,233		105,400					-	
Estimate	0	0	0	Ō	Ó	_58	299	144	85	47	397	14	0	
Variance	0	0	0	0	0	727	14,367	4,038	1,620	620	10,059	49	0	
acific Halibut Harvested														
Estimate	4	118	26	461	692	2,135	3,006	2,530	1,150	661	876	449	565	
Variance	16	3,499	128	20,314	19,902	170,177	183,770	82,551	73,018	33,973	21,506	5,425	31,144	
Pacific Halibut Released														
Estimate	13	26	29	273	286	553	1,209	1,118	522	291	267	279	161	
Variance	79	551	297	11,963	11,669	18,868	55,987	36,407	51,073	28,487	7,716	13,633	3,185	
Steelhead Harvested	0	0	0	0	0	0	0	0	0	0	0	0	0	
Estimate Variance	ŏ	ŏ	ŏ	ő	ŏ	ő	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	
Steelhead Released				_										
Estimate	0	0	Ŏ	0	0	0	0	0	0	0	0	0	0	
Variance Cutthroat Trout	0	0	0	U	U	U	U	U	U	U	U	U	U	
Harvested														
Estimate	ō	0	0	0	0	0	0	. 9	0	0	0	0	0	
Variance Cutthroat Trout	0	0	0	0	0	0	0	79	0	U	U	U	U	
Released														
Estimate	0	0	0	Ō	0	0	0	0	. 0	0	0	0	0	
Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	
Olly Varden Harvested Estimate	45	189	271	82	257	257	260	91	7	16	5	23	5	
Variance	957	23,430	30,141	354	27,070	4,898	34,488	85 6	49	122	22	439	22	
olly Varden Released		1.0		0.4	0.0	101	20	20	0	16	0	5	0	
Estimate Variance	0	16 195	11 102	94 717	82 1,127	181 4,992	39 274	39 460	Ö	16 76	Ö	19	ŏ	
ing Cod Harvested					-	·								
Ĕstimate	0	0	0	0	.8	0	0	0	0	0	0	0	0	
Variance	0	0	0	0	55	0	0	0	0	0	0	0	0	
ing Cod Released Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0	
Variance	ŏ	ŏ	ō	ō	ō	Ō	Ō	Ō	Ö	0	0	0	0	
(elp Greenling														
Harvested Estimate	0	0	0	0	0	0	0	0	0	0	0	0	5	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	Ŏ	ŏ	ō	ō	Ö	22	
elp Greenling														
Released	0	n	0	0	0	0	0	0	0	0	0	0	0	
Estimate Variance	ŏ	Ö	ŏ	ő	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	
11 Rockfish Harvested		_		_	-		_	_					. <u>.</u>	
Estimate	o O	0	15	50	53 750	119	153	271	62 1,488	10 35	128 2,022	58 1,301	47 638	
Variance 11 Rockfish Released	0	0	195	437	/50	1,626	2,020	12,216	1,400	35	2,022	1,301	030	
Estimate	0	0	22	6	48	0	15	6	55	0	4	10	28	
Variance	0	0	409	26	929	0	99	26	2,217	0	15	36	391	

Derby held on 5-7 August 1988.

Appendix Table 11. Estimated effort and catches for the Haines marine boat sport fishery, 11 April - 10 July 1988.

	APPROXIMATE		APPROXIMATE
	95% C.I. LOWER		95% C.I. UPPER
	LIMIT	ESTIMATE	LIMIT
Boat-hours Fished	11,606	14,214	16,822
Salmon-hours Fished	25,772	32,723	39,674
Halibut-hours Fished	1,957	3,435	4,913
Ling cod-hours Fished	0	0	0
Rockfish-hours Fished	0	0	0
Bottomfish-hours Fished	1,957	3,435	4,913
Angler-hours Fished	29,102	36,222	43,343
Boat-Days Fished	2,061	2,518	2,975
Large Chinook Salmon Harvested	280	481	682
Derby Take-home	29	39	141
Derby Entered		59	
Derby Take-home & Entered	88	98	200
Large Chinook Salmon Released	13	24	64
Small Chinook Salmon Harvested	1	7	19
Derby Take-home	0	0	0
Derby Entered		0	
Derby Take-home & Entered	0	0	0
Small Chinook Salmon Released	252	422	591
Coho Salmon Harvested	0	0	0
Coho Salmon Released	0	0	0
Chum Salmon Harvested	0	0	0
Chum Salmon Released	0	0	0
Sockeye Salmon Harvested	0	0	0
Sockeye Salmon Released	0	0	0
Pink Salmon Harvested	0	0	0
Pink Salmon Released	0	0	0
Pacific Halibut Harvested	28	221	439
Pacific Halibut Released	2	17	40
Steelhead Harvested	0	0	0
Steelhead Released	0	0	0
Cutthroat Trout Harvested	0	0	0
Cutthroat Trout Released	0	0	0
Dolly Varden Harvested	222	323	424
Dolly Varden Released	55	100	145
Ling Cod Harvested	0	0	0
Ling Cod Released	0	0	0
Kelp Greenling Harvested	1	6	15
Kelp Greenling Released	0	0	0
All Rockfish Harvested	1	6	17
All Rockfish Released	0	0	0

Appendix Table 12. Estimated effort and catches for the Haines marine boat sport fishery by seasonal period, 11 April - 10 July 1988.

					Seasona	l Period				
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 15MAY88	16MAY88 - 22MAY88	23MAY88 - 29MAY88	Derby 1	30MAY88 - 05JUN88	06JUN88 - 12JUN88	27JUN88 - 03JUL88	04JUL88 - 10JUL88
Number of Samples Number of Boats Counted	20 21	20 17	20 19	20 37	18 115	14 276	13 158	21 126	10 12	10 17
Number of Boats Interviewed	21	17	19	37	114	275	158	125	12	17
Hours Sampled Hours Available to Sample	56 413	59 543	64 336	63 347	62 357	69 150	54 272	63 368	35 368	36 368
Boat-hours Fished Estimate Variance	369 17,657	530 29,683	2 4 5 9,110	541 46,826	3,154 709,578	2,190 25,885	2,944 512,074	3,276 305,075	462 24,554	503 20,278
Salmon-hours Fished Estimate	714	1,156	431	1,121	8,789 6,118,040	6,101	7,321 3,271,887	6,869 2,000,247	183 3,812	39 1,431
Variance Halibut-hours Fished Estimate	73,186 75	238,971	34,089 37 568	233,523 87 3,718	241 11,630	104,485 15 37,054	53 1,110	690 54,500	707 104,540	1,516 327,529
Variance Ling cod-hours Fished Estimate	5,113 0 0	223 0 0	0 0	3,718	11,630	37,054	0 0	54,500 0	0 0	327,528
Variance Rockfish-hours Fished Estimate	0	0	0	0	0	0	0	0	0	
Variance Bottomfish-hours Fished Estimate	75 5,113	16 223	37 568	87 3,718	241 11,630	15 37,054	53 1,110	690 54,500	707 104,540	1,510 327,529
Variance Angler-hours Fished Estimate Variance	789 78,299	1,172 239,891	468 34,387	1,208 245,494	9,029 6,230,579	6,115 30,978	7,374 3,300,759	7,559 2,104,055	954 123,266	1,554 287,65
variance Boat-days Fished Estimate Variance	70,239 100 851	162 1,351	80 862	141 2,630	530 17,388		542 14,813	690 11,199	119 849	15/ 2,318
arge Chinook Harvested Estimate Variance	3 8	51 859	10 42	0	25 48	98 2,620	100 1,167	193 5,392	0	_,
arge Chinook Released Estimate Variance	0	0	0	0	0	10 290	14 98	0	0	(
imall Chinook Harvested Estimate Variance	0	0	0	0	0	0	0	7 37	0	
mall Chinook Released Estimate Variance	0	0	3	0	4 11	26 41	121 3,417	267 3,725	0	
oho Harvested Estimate Variance	0	0	0	0	0	0	0	0	0	
oho Released Estimate Variance	0	0	0	0	0	0	0	0	0	
hum Harvested Estimate Variance	0	0	0	0	0	0	0	0	0	
hum Released Estimate Variance	0	0	0	0	0	0	0	0	0	

Appendix Table 12. Estimated effort and catches for the Haines marine boat sport fishery by seasonal period, 11 April - 10 July 1988 (Continued).

					Seasonal	Period				
	11APR88 - 24APR88	25APR88 - 08MAY88	09MAY88 - 15MAY88	16MAY88 - 22MAY88	23MAY88 - 29MAY88	Derby ¹	30MAY88 - 05JUN88	06JUN88 - 12JUN88	27JUN88 - 03JUL88	04JUL88 - 10JUL88
Sockeye Harvested	_							•	•	C
Estimate	0	ō	0	0	0	0	0	0	0	į.
Variance	U	0	U	U	U	U	U	U	U	
Sockeye Released	0	0	0	0	0	0	0	0	0	c
Estimate	0	ŏ	0		ŏ	ŏ	ő	ő	ő	č
Variance		U	U	U	U	U	U	U	U	•
ink Harvested Estimate	0	0	0	0	0	0	0	0	0	C
	ŏ	ŏ	Ö		ŏ	ŏ	ő	ŏ	ő	č
Variance Pink Released	U	U	U	U	U	U	U	U	·	
	0	0	0	0	0	0	0	0	0	C
Estimate	ŏ	ŏ	ŏ		ŏ	ŏ	ŏ	ŏ	ŏ	č
Variance Pacific Halibut Harvested	· ·	v	U	v	U	v	J	·	•	~
Estimate	0	0	0	0	13	2	0	17	40	149
	ŏ	ö	ŏ		76	ō	ŏ	171	1,440	10,179
Variance Pacific Halibut Released	U	U	U	U	70	U	· ·	1/1	1,440	10,1/5
	0	0	0	0	0	0	0	0	0	17
Estimate	Ö	Ö	ŏ		ŏ	ő	ŏ	ŏ	ŏ	127
Variance	U	U	U	U	U	U	U	U	U	12/
teelhead Harvested	0	0	0	0	0	0	0	0	0	(
Estimate	o n	0	ŏ		ő	ŏ	ő	ŏ	ő	,
Variance	U	U	U	U	U	U	U	v	U	,
teelhead Released	0	0	0	0	0	0	0	0	n	C
Estimate	ŏ	0	0		ŏ	ő	ő	ŏ	ŏ	č
Variance	U	U	U	U	U	U	U	U	U	,
Cutthroat Trout Harvested	0	0	0	0	0	0	0	0	0	c
Estimate	o o	ŏ	0		ŏ	0	ŏ	ŏ	ŏ	č
Variance	U	U	U	U	U	U	U	U	·	`
utthroat Trout Released	0	0	0	0	0	0	0	0	0	(
Estimate	ő	ŏ	0		ŏ	ŏ	· ŏ	ŏ	ŏ	č
Variance	U	U	U	U	U	U	. 0	Ų	U	•
olly Varden Harvested	a	0	0	19	60	32	71	77	30	34
Estimate	0	0	0		589	32	551	893	30	358
Variance	U	U	U	105	209	32	331	033	U	330
olly Varden Released	0	0	0	0	41	18	21	10	10	(
Estimate	Ö	ŏ	ő		185	65	110	50	90	ò
Variance	U	U	U	U	100	65	110	50	90	`
ing Cod Harvested	0	0	0	0	0	0	0	0	0	(
Estimate	0	ő	0		ő	Ö	ŏ	ő	ŏ	č
Variance	U	U	U	U	U	U	U	U	v	,
ing Cod Released	0	0	0	0	0	0	0	0	0	(
Estimate	ő	0	ŏ		ŏ	ŏ	ő	ő	ŏ	ò
Variance	U	U	U	U	U	U	U	U	U	
elp Greenling Harvested		0	0	0	0	0	0	6	0	(
Estimate	0					0	0	20	ŏ	Ċ
Variance	0	0	0	0	0	U	U	20	U	,
elp Greenling Released	_	_	_	_	0	0	0	. 0	0	,
Estimate	0	0	0		0	0	0	0	0	(
Variance	0	0	0	0	Ü	U	U	U	U	
11 Rockfish Harvested	_	_	_	_	_	_	_	_	_	
Estimate	o o	0	0		ō	0	0	o o	_6	
Variance	0	0	0	0	0	0	0	0	29	C
11 Rockfish Released					_	_	_	_	_	
Estimate	Ō	0	0	0	0	0	0	o o	0	9
Variance	0	0	0	0	0	0	0	0	0	(

Derby held on weekends of 28-30 May and 4-5 June 1988.

Appendix Table 13. Numbers of chinook salmon examined for coded-wire tags in southeast Alaska marine sport fisheries in 1988.

		Larg	e Chinook		Sma1	l Chinook	
Fishery	Seasonal Period	Estimated Harvest	Number Sampled	Percent	Estimated Harvest	Number Sampled	Percent
Ketchikan	Non-derby 4/11-6/19	485	33	7	19	1	:
	Non-derby 6/20-7/31	1,706	144	8	113	12	1:
	Non-derby 8/1-9/25	1,169	97	8	145	3	:
	Derby Entered ¹	509	509	100	8	8	100
	Derby Take Home	1,019	69	7	72	3	
·	Total	4,888	852	17	357	27	
Petersburg	Non-derby 4/11-7/17	1,565	204	13	20	3	1
	Derby Entered ²	340 	304	89 	11 	5	4:
	Total	1,905	508	27	31	8	20
Wrangell	Non-derby 4/11-7/17	1,535	242	16	0	0	
Sitka	Non-derby 4/11-6/19	906	55	6	0	0	
	Non-derby 6/20-7/31	1,056	102	10	7	1	1
	Non-derby 8/1-9/25	447	43	10	0	0	
	Derby Entered ³	608	608	100	10	10	10
	Derby Take Home ³	144	19	, 13	0	0	
	Total	3,160	827	26	17	11	6
Juneau							
Normal Dock	Non-derby 4/11-6/19	1,130	135	12		10	1
Survey	Non-derby 6/20-7/31	-	263	12		10	1
	Non-derby 8/1-9/25	938	94	10		13	1
	Derby Entered4	549	549	100		19	10
	Derby Take Home ⁴	88 	15 	17 	21 	3 	
	Total	4,976	1,056	21	279	55	2
Shelter Lodge	Non-derby 6/20-7/31	283	283	100	25	21	٤
Survey	Non-derby 8/1-9/25	84 		100	36 	20 	
	Total	367	367	100	61	41	6
Both	Non-derby 4/11-6/19	1,130	135	12		10	1
	Non-derby 6/20-7/31	2,554	546	21		31	3
Shelter Lodge	Non-derby 8/1-9/25	1,022	178	17		33	2
Survey combined	d Derby Entered ⁴ Derby Take Home ⁴	549 88	549 15	100 17	19 21	19 3	10 1
	Total	5,343	1,423	27	340	96	2
Haines	Non-derby 4/11-7/10	383	0	0	7	1	1
	Derby Entered ⁵	59	59	100			
	Derby Take Home ⁵	39	29	75 	0	0	
	Total	481	88	18	7	1	1
Grand Total		17,312	3,940	23	751	143	1

Derby held on weekends of 28-30 May, 4-5 June, and 11-12 June.

Derby held on 28-30 May weekend.

Derby held on weekends of 28-30 May and 4-5 June.

Derby held on 5-7 August weekend.

⁵ Derby held on weekends of 28-30 May and 4-5 June.

Appendix Table 14. Estimates of hatchery produced and wild-tagged chinook salmon contributed to the Ketchikan marine sport fishery from 11 April to 25 September 1988.

				Non-c	lerby 4/	11-6/19		Derby	1	Non-de	rby 6/2	20-7/31	Non-der	-by 8/1-	9/25		Total	
Region	Agency ²	Hatchery/ Release Site	Tag Code	Recov	Contr ⁴	Var. of Contr		Contr	Var. of Contr	Recov ³	Contr	Var. of Contr	Recov	Contr	Var. of Contr	Recov	v ³ Contr ⁴ 1 224 1 1 2 225 1 77 1 12 2 90 1 24 1 2	Var. of Contr
Oregon	ANAD	ANADROMOUS, INC	62-17-51	1	224	53,727										1	224	53,727
	ODFW	MCKENZIE	07-37-32				1	1								1	1	
		Oregon Total		1	224	53,727	1	1								2	3 Contr ⁴ 224 1 225 77 12 90 24	53,727
Washington	WDF	NASELLE	63-28-47							1	77	5,938				1	77	5,938
		ROCKY REACH	63-31-12							1	12	278				1	12	278
		Washington Total								2	90	6,216				2	90	6,216
Britsh	CDFO	CHEHALIS RIVER/BC	02-37-58				1	24	746							1	24	746
Columbia		MARBLE RIVER PIP	02-28-61				1	2	4							1	2	4
	CDFR	QUINSAM RIVER	08-22-62				1	1	0							1	1	0
		British Columbia T	otal				3	27	750							3	27	750

Appendix Table 14. Estimates of hatchery produced and wild-tagged chinook salmon contributed to the Ketchikan marine sport fishery from 11 April to 25 September 1988 (Continued).

				Non-d	lerby 4/	11-6/19		Derby	1	Non-de	rby 6/2	0-7/31	Non-der	by 8/1-	9/25		Total	
Region	Agency ²	Hatchery/ Release Site	Tag Code	Recov	Contr	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov	3 Contr	Var. of Contr
Southeast Alaska	ADF&G	CRYSTAL LAKE	04-23-53				1	3	7							1	3	7
Alaska		DEER MOUNTAIN	04-23-02 04-25-35				2 1	10 24	37 746							2 1	10 24	37 746
	MIC	TAMGAS CREEK	47-16-25 47-16-28 47-16-35				4 1	36 1	295 	 1	 9	73				4 1 1	36 1 9	295 73
	SSRAA	NEETS BAY	04-03-21 04-03-42 04-03-44 04-03-45 04-26-28R3	1 1	35 238	1,281	8 2 3 1 1	152 22 59 17 1	8,363 419 1,314 283	1 1 1	66 9 244	4,478 73 66,449				10 2 4 3 1	254 22 67 499 1	14,122 419 1,387 126,983
		WHITMAN LAKE	04-03-29 04-03-30 04-03-31 04-03-32 04-03-33 04-03-46 04-03-49 04-03-50 04-22-55 04-24-30 04-22-63 04-25-03 04-26-31R1 04-26-31R3 04-40-63	1	19		1 1 1 2 2 2 1 1 1 2 3 3 1 14 4	2 2 2 68 2 1 1 7 51 3 43 52	3 3 3 2,337 0 18 1,947 9475 1,773	2 1 2 2 1 1 3 1 1 1	49 13 21 13 11 21 39 21 5	1,269 165 71 70 108 412 674 441 244 278	1	66	30	3 2 1 1 2 4 4 3 1 2 2 2 2 3 2 17 5 1 1 1 2 2 2 2 2 1 1 1 1 2 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	60 15 2 68 27 22 1 13 12 7 51 82 74 82 12 4	1,269 168 2,333 30 71 108 1,947 420 1,148 2,219 278
		Southeast Alaska	Total	3	292	61,532	60	566	18,034	19	531	74,585	2	16	30	84	1,405	154,18
		All Regions Grand	Total	4	516	115,259	64	595	18,784	21	620	80,801	2	16	30	91	1,747	214,874
ild lecoveries	ADF&G	CHICKAMIN RIVER	04-25-48 04-21-49							1	13					1	13 1	

Derby held on weekends of 28-30 May, 4-5 June, and 11-12 June.

ANAD = Anadromous, Inc.

CDFO = Canadian Department of Fisheries and Oceans

MIC = Metlakatla Indian Community

ODFW = Oregon Department of Fish and Wildlife

CDFR = Canadian Department of Fisheries Research

SSRAA = Southern Southeast Regional Aquaculture Association

WDF = Washington Department of Fisheries ADF&G = Alaska Department of Fish and Game

Recov = Number of fish recovered of noted tag code.

Contr = Estimated harvest of the release of the noted tag code.

Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Estimates of wild recoveries are not expanded by the tagging fraction.

Appendix Table 15. Estimates of hatchery produced chinook salmon contributed to the Petersburg marine sport fishery from 11 April to 17 July 1988.

		Hatchery/		Non-d	erby 4/:	11-7/17		Derby	l 		Total	
Region	Agency ²	Release Site	Tag Code	Recov ³	Contr ⁴	Var. of Contr ⁵	Recov ³	Contr ⁴	Var. of Contr ⁵	Recov ³	Contr ⁴	Var. of Contr ⁵
Oregon	ODFW	COLE RIVERS	07-35-42				1	2	3	1	2	3
		Oregon Total					1	2	3	1	2	3
Washington	WDF	GRAYS RIVER	63-33-26				1	1	ō	1	1	
		Washington Total					1	1	0	1	1	c
British Columbia	CDFO	KITIMAT RIVER	02-32-55	1	5	23				1	5	23
COTUMBIA		ROBERTSON CREEK	02-31-51	1	168	28,056				1	168	28,056
	CDFR	QUINSAM RIVER	08-20-55 08-22-59	1	<u>-</u>	15	1	1	0	1 1	1 4	0 15
		British Columbia To	tal	3	178	28,095	1	1	0	4	179	28,095
Southeast Alaska	ADF&G	CRYSTAL LAKE	04-22-29 04-23-21 04-23-53 04-23-54 04-23-55 04-23-56 04-25-11 04-25-31 B4-13-01	 1 3 4 5 1	 44 72 194 227 19 4	1,951 958 12,221 12,704 351	2 1 1 3 3 3 1	5 2 4 16 22 23 5	9 3 10 65 145 159 22	0 4 1 9 2 3 1 10 2 65 6 145 7 2 159 8 2 22 2 1 0 1	5 2 48 87 216 250 24 4	1,960 1,023 12,366 12,863 373
		HIDDEN FALLS	04-23-36				1	1	. 0	1	1	0
	NMFS	LITTLE PORT WALTER	03-18-09 03-18-12 03-18-14 03-18-26 03-18-28 03-18-34 03-18-36 03-19-17	 1 1 1	4 12 5	14 129 18	1 2 1 2 1	1 2 1 2 2	0 0 0 0 3	1 2 1 2 1 1 1	1 2 1 4 2 12 5 2	0 0 0 14 0 129 18 3
	SSRAA	NEETS BAY	04-03-21 04-03-36				1	5 2	17 3	1	5 2	17 3
		WHITMAN LAKE	04-03-32				1	2	3	1	2	3
		Southeast Alaska To	tal	18	580	28,346	26	98	437	44	2 24 1 1 1 1 1 1 1 1 1 2 2 2 1 1 4 2 2 1 1 5 1 5 1 5 1 2	28,783
		All Regions Grand T	otal	21	757	56,440	29	103	440	50	860	56,881

¹ Derby held on weekends of 28-30 May, 4-5 June, and 11-12 June.

ODFW = Oregon Department of Fish and Wildlife CDFO = Canadian Department of Fisheries and Oceans CDFR = Canadian Department of Fisheries Research ADF&G = Alaska Department of Fish and Game NMFS = National Marine Fisheries Service

Recov = Number of fish recovered of noted tag code.

⁴ Contr = Estimated harvest of the release of the noted tag code.

Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix Table 16. Estimates of hatchery produced chinook salmon contributed to the Wrangell marine sport fishery from 11 April to 17 July 1988.

		Hatchery/		4,	/11-7/17	7		Total	
Region	Agency	Release Site	Tag Code	Recov ²	Contr ³	Var. of Contr	Recov ²	Contr ³	Var. of Contr
Southeast Alaska	SSRAA	NEETS BAY	04-03-36	1	203	49,323	1	203	49,323
		WHITMAN LAKE	04-03-33	1	16	249	1	16	249
			04-24-63	1	5	21	1	5	21
		Southeast Alaska	Total	3	225	49,593	3	225	49,593
		All Regions Gran	3	225	49,593	3	225	49,593	

SSRAA = Southern Southeast Regional Aquaculture Association

SSRAA = Southern Southeast Regional Aquaculture Ass.

Recov = Number of fish recovered of noted tag code.

Control = Estimated baryont of the release of the not

Contr = Estimated harvest of the release of the noted tag code. Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix Table 17. Estimates of hatchery produced chinook salmon contributed to the Sitka marine sport fishery from 11 April to 25 September 1988.

		Uahahamu /		Non-d	erby 4/	11-6/19		Derby	1	Non-d	erby 6/2	20-7/31	Non-d	erby 8/	1-9/25		Total	
Region	Agency ²	Hatchery/ Release Site	Tag Code	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. o
Oregon	ODFW	BONNEVILLE	07-31-26 07-33-18 07-33-26 07-37-54 07-38-23			 	1 1 2 1 1	1 1 31 1 1	0 455 			 			 	1 1 2 1 1	1	455
		Oregon Total					6	35	455							6	35	455
Washington	WDF	GRAYS RIVER	63-33-26							1	7	43				1	. 7	43
		HUMPTULIPS	63-32-30										1	15	221	1	. 15	22:
		LYONS FERRY	63-41-56R2				1	1								1	. 1	
		PRIEST RAPIDS	63-28-59 63-32-21				1	9 7	68 40							1 1	_	68 40
		WASHOUGAL	63-34-08				1	1	0							1	. 1	(
	QDNR	QUINAULT LAKE	21-16-21							1	13	171				1	. 13	17:
	USFWS	L WHITE SALMON NFH	05-12-56 05-13-37				1	1	0	1	13	 157				1 1		
		SPRING CREEK NFH	H5-07-04				1	1	0							1	. 1	
		Washington Total					6	20	108	3	33	371	. 1	15	221	1 10	68	
British Columbia	CDFO	CONUMA RIVER	02-26-33 02-32-10 02-32-18 02-32-25				1 1 .1 .1	4 7 21 2	11 40 426 1							1 1 1 1	. 21	426
		KITIMAT RIVER	02-36-30										1	76	9,876	1	. 76	9,876
		MARBLE RIVER PIP	02-27-49 02-27-50 02-28-61	1	20 	366	 1 1	 1 2	 0 4							1 1 1	. 1	(
		NITINAT RIVER	02-26-54 02-28-12 02-32-30				1 1 1	24 24 1	544 548							1 1 1		548
		QUINSAM RIVER	02-33-28 02-35-56			===	1	13 1	168 							1	13	
		ROBERTSON CREEK	02-31-42 02-31-51 02-32-03 02-33-04				1 1 1	21 41 53	409 1,618 2,704				1	536	297,075	1 1 1 1		1,618
		TERRACE CDP	02-27-58				1	1								1	. 1	
		THORNTON CR CDP	02-27-26				2	2	0	1	7	48				3	9	48
		British Columbia To	tal	1	20	366	17	217	6,473	1	7	48	2	612	306,951	21	857	313,839

Appendix Table 17. Estimates of hatchery produced chinook salmon contributed to the Sitka marine sport fishery from 11 April to 25 September 1988 (Continued).

	2 Agency	Hatchery/ Release Site	Tag Code	Non-derby 4/11-6/19				Derby ¹			erby 6/2	20-7/31	Non-derby 8/1-9/25			Total		
Region				Recov ³	Contr ⁴	Var. of Contr	Recov ³		Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr
Southeast Alaska	ADF&G	CRYSTAL LAKE	04-23-53 04-23-54 04-23-55				1 2 1	3 9 7	7 33 38							1 2 1	3 9 7	7 33 38
		DEER MOUNTAIN	04-25-39				1	1								1	1	
	NSRAA	MEDVEJIE CIF	04-22-46				1	8	61							1	. 8	61
	SSRAA	NEETS BAY	04-03-21				1	4	13							1	. 4	13
		WHITMAN LAKE	04-03-29 04-03-48 04-03-49 04-13-35				1 1	 1		1	7 	50	1 1	13 11	174 119		21 11 1	224 119
		Southeast Alaska	Total				9	35	153	1	7	50	2	24	, 292	12	66	496
		All Regions Gran	i Total	1	20	366	38	307	7,190	5	48	469	5	651	307,464	49	1,026	315,489

Derby held on weekends of 28-30 May and 4-5 June.

QDNR = Quinault Department of Natural Resources ADF&G = Alaska Department of Fish and Game

²ODFW = Oregon Department of Fish and Wildlife
USFWS = U.S. Fish and Wildlife Service
NSRAA = NorthernSoutheast Regional Aquaculture Association

WDF = Washington Department of Fisheries CDFO = Canadian Department of Fisheries and Oceans SSRAA = Southern Southeast Regional Aquaculture Association

Recov = Number of fish recovered of noted tag code.

Contr = Estimated harvest of the release of the noted tag code.

Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix Table 18. Estimates of hatchery produced chinook salmon contributed to the Juneau marine sport fishery from 11 April to 25 September 1988.

		Hatchery/		Non-de	erby 4/1	11-6/19	Non-de	rby 6/2	0-7/31	Non-d	erby 8/	1-9/25		Derby	1	Total				
Region	Agency ²	Release Site	Tag Code	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr		
Oregon	ODFW	BONNEVILLE	07-38-28							1	2					1	. 2	3		
		WILLAMETTE	07-37-35 07-37-42										1	1	0	1 1		0		
		Oregon Total								1	2	3	2	2	0	3	4	3		
Washington	WDF	COWLITZ	63-27-48										1	1	0	1	1	0		
		PRIEST RAPIDS	63-28-59				1	83	6,803							1	. 83	6,803		
		WASHOUGAL	63-34-15				1	15	209							1	. 15	209		
	USFWS	ROCK CREEK PENS	B5-04-08							1	1					1	1			
		Washington Total					2	98	7,012	1	1		1	1	0	4	100	7,012		
British	CDFO	DEVEREUX CREEK	02-40-14										1	1	0	1	1	0		
Columbia		KITIMAT RIVER	02-32-53 02-32-54				1	2	2				2			2	. 2	1,951 2		
			02-32-55 02-36-28							1			1	1	0	1	1	0		
			02-36-29							ī						1	. 4			
		MARBLE RIVER PIP	02-36-35 02-27-50				1	7	45		_					1		45		
		PUNTLEDGE RIVER	02-41-04							1	1					1	. 1			
		QUINSAM RIVER	02-33-26 08-23-52										1		157 0	1		157 0		
		SNOOTLI CREEK	02-32-57 02-33-07 02-36-42				1 	 8 	57	1 	11 	0	 1	 6	34	1 1 1	. 8	0 57 34		
		TENDERFOOT CREEK	02-36-52										1	1	0	1	. 1	0		
		British Columbia T	otal				3	17	104	5	23	0		87	2,142	16	127	2,246		
Southeast Alaska	ADF&G	CRYSTAL LAKE	04-23-21 04-23-55 04-25-12 04-25-13 04-25-31 04-25-31 04-25-31				2 1 1	10	1 123 1,690	2 1	9 2	57 79 3	1 1 1 2 3	5 9 	 19	3 1 1 1 1 4 1 3	7 5 10 5 18	58 40 18 123 19 128 3 321 1,690		
			04-26-16 04-27-35 B4-11-14							1		3		1 		1 1	. 2	3		
		HIDDEN FALLS	04-19-56 04-21-10 04-23-35 04-24-12				 1 1	1 1 13	0 0 151				1 1	 1 1	 0 0	1 1 1 2	1	0 0 0 151		

Appendix Table 18. Estimates of hatchery produced chinook salmon contributed to the Juneau marine sport fishery from 11 April to 25 September 1988 (Continued).

		Hatchery/ Release Site		Non-derby 4/11-6/19 Non-derby 6/20-7/31 Non-derby 8							erby 8/1	1-9/25 Derby Tota						.1	
Region	Agency ²		Tag Code	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr	Var. of Contr	
Southeast Alaska (Continued)	ADF&G (Continued)	SNETTISHAM	04-01-63 04-02-63 04-04-63 04-07-63 04-09-63 04-23-50 04-23-63 04-26-03 04-26-03 04-26-05 04-26-05 04-26-08 04-27-50 04-57-63	1 1 1 2 2 2 1 1	10 27 6 	790 29 83 38	1 3 3 3 4 4 4 3	7 1 6 14 32 38 16 20 5 29 20	46 37 184 1,017 68 217 1 135 124	1 1 2 2 7	5 10 5 25 13	21 57 6 128 76	5		0 0 27 27 216 216 216	1 1 1 3 6 5 9 17 4 6 1 2	10 6 14 65 46 45 47 29 29	21 37 184 1,833 96 57 522 383 135 200 0	
	AKI	PORT ARMSTRONG	04-58-63 04-13-23				1	1		1		3				1			
	MIC	TAMGAS CREEK	47-16-31				1	64	4,210					~		1			
	NMFS	LITTLE PORT WALTER	03-18-26 03-18-27 03-18-30 03-18-30 03-18-31 03-18-44 03-18-47 03-18-58 03-19-04 03-19-09 03-19-12 03-19-17 03-19-17 03-19-17 03-19-32 03-19-32 03-19-32 03-19-35 03-19-46 03-19-57 03-19-58 03-19-58 03-19-58 03-19-58 03-19-58 03-22R1 03-62-22R1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	20,303		8	36	11 11 11 11 11 11 11 11 11 11 11 11 11	114 	57	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	000000000000000000000000000000000000000	1 1 1 1 1 1 2 1 3 2 1 1 1 1 1 1 1 1 1 1	1 1 15 15 16 1 16 1 3 2 3	0 0 0 108,812 0 30 1 0 1 1 0 20,303	

Appendix Table 18. Estimates of hatchery produced chinook salmon contributed to the Juneau marine sport fishery from 11 April to 25 September 1988 (Continued).

				Non-d	erby 4/	11-6/19	Non-de	erby 6/2	20-7/31	Non-de	erby 8/1	1-9/25		Derby	1		Total	
Region	Agency ²	Hatchery/ Release Site	Tag Code	Recov ³	Contr ⁴	Var. of Contr	3	4	Var. of Contr	Recov ³		Var. of Contr		Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr
Southeast Alaska (Continued)	SSRAA	NEETS BAY	04-03-21 04-03-43 04-03-44 04-13-27	1		1,279 	1 1 	39 10 2	1,637 123 1	1 	21 	418 	1 2	4 120 	14 10,973	3 2 2 1	80 31 120 2	541
		WHITMAN LAKE	04-03-29 04-03-33 04-03-46 04-03-47 04-03-48 04-03-50 04-13-31	1 			3 1 1 2	30 1 8 2	756 0 0	1 1	13 1	150 	1 1 1 2 1	2 2 1 8 5	3 3 0 216 18	2 5 1 1 1 4 2	12 45 1 1 8 10 6	909 0 0
		Southeast Alaska	Total	12	139	22,591	54	443	10,629	33	157	109,973	46	240	12,168	145	979	155,362
		All Regions Gran	nd Total	12	139	22,591	59	558	17,745	40	183	109,976	57	331	14,310	168	1,210	164,623

Derby held on 5-7 August weekend.

Recov = Number of fish recovered of noted tag code.

⁴ Contr = Estimated harvest of the release of the noted tag code.

Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix Table 19. Age composition of chinook salmon from select southeast Alaska sport fisheries, 1988.

						Brood	Year				
_			1985		984		983		982	1981	
Sport Fishery			0.2	0.3	1.2	0.4	1.3	0.5	1.4	1.5	Sample Size
<u>Ketchikan</u>	Males	n Percent S.E.	2 18.2 11.6	2 18.2 11.6	5 45.5 15.0		2 18.2 11.6				11
	Females	n Percent S.E.			1 16.7 15.2	1 16.7 15.2	3 50.0 20.4		1 16.7 15.2		6
	Total	n Percent S.E.	4 0.8 0.4	42 8.7 1.3	106 21.9 1.9	20 4.1 0.9	204 42.1 2.2	2 0.4 0.3	104 21.5 1.9	2 0.4 0.3	484
<u>Petersburg</u>	Males	n Percent S.E.		6 6.9 2.7	5 5.7 2.5	2 2.3 1.6	25 28.7 4.9		47 54.0 5.3	2 2.3 1.6	87
	Females	n Percent S.E.		4 4.4 2.1	2 2.2 1.5	2 2.2 1.5	29 31.9 4.9	3 3.3 1.9	50 54.9 5.2	1 1.1 1.1	91
	Total	n Percent S.E.	0.3 0.3	26 7.1 1.3	13 3.6 1.0	10 2.7 0.9	110 30.1 2.4	5 1.4 0.6	196 53.7 2.6	4 1.1 0.5	365
<u>Wrangell</u>	Males	n Percent S.E.			2 7.7 5.2		8 30.8 9.1		16 61.5 9.5		26
	Females	n Percent S.E.			7.7 4.3		11 28.2 7.2		24 61.5 7.8	1 2.6 2.5	39
	Total	n Percent S.E.			11 7.5 2.2		33 22.6 3.5		101 69.2 3.8	1 0.7 0.7	146
<u>Sitka</u>	Males	n Percent S.E.		9 60.0 12.6		4 26.7 11.4			2 13.3 8.8		15
	Females	n Percent S.E.		23 65.7 8.0		5 14.3 5.9		1 2.9 2.8	3 8.6 4.7		35
	Total	n Percent S.E.	4 1.1 0.5	58.9	3.7	71 18.9 2.0	45 12.0 1.7		13 3.5 0.9	5 1.3 0.6	375

Appendix Table 19. Age composition of chinook salmon from select southeast Alaska sport fisheries, 1988 (continued).

						Brood	Year				
			1985		984		983		982	1981	
Sport Fishery			0.2	0.3	1.2	0.4	1.3	0.5	1.4	1.5	Sample Size
Juneau	Males	n Percent S.E.	5 7.7 3.3	11 16.9 4.7	12 18.5 4.8	2 3.1 2.1	16 24.6 5.3		17 26.2 5.5	2 3.1 2.1	65
	Females	n Percent S.E.	5 4.5 2.0	20 17.9 3.6	11 9.8 2.8	10 8.9 2.7	38 33.9 4.5		28 25.0 4.1		112
	Total	n Percent S.E.	12 4.7 1.3	46 18.0 2.4	42 16.4 2.3	16 6.3 1.5	76 29.7 2.9		62 24.2 2.7	2 0.8 0.6	256
<u>Juneau</u> Derby	Males	n Percent S.E.	2 6.1 4.2	8 24.2 7.5	8 24.2 7.5	1 3.0 3.0	12 36.4 8.4		2 6.1 4.2		33
	Females	n Percent S.E.	3 4.2 2.4	27 38.0 5.8	10 14.1 4.1	2 2.8 2.0	25 35.2 5.7		4 5.6 2.7		71
	Total	n Percent S.E.	12 7.7 2.1	54 34.8 3.8	29 18.7 3.1	3 1.9 1.1	51 32.9 3.8		6 3.9 1.5		155
<u>Haines</u>	Males	n Percent S.E.			5 9.8 4.2		13 25.5 6.1		29 56.9 6.9	7.8 3.8	51
	Females	n Percent S.E.			3 4.5 2.5		9 13.4 4.2		52 77.6 5.1	3 4.5 2.5	67
	Total	n Percent S.E.			8 6.2 2.1		23 17.8 3.4		90 69.8 4.0	8 6.2 2.1	129

¹ Standard error in percent.

Appendix Table 20. Length at age in millimeters, by sex, for chinook salmon from select southeast Alaska sport fisheries, 1988.

						Brood	Year				
			1985	19	84	19	83	19	82	1981	
Sport Fishery			0.2	0.3	1.2	0.4	1.3	0.5	1.4	1.5	Sample Size
<u>Ketchikan</u>	Males	Mean S.E. n	743 32 2	815 155 2	737 25 5		912 119 2				11
	Females	Mean S.E. n			685 1	1090 1	833 38 3		1030 1		6
	Total	Mean S.E. n	714 22 4	831 14 41	719 5 105	940 22 20	854 5 202	945 75 2	973 8 103	1099 52 2	479
<u>Petersburg</u>	Males	Mean S.E.		817 30 6	737 37 5	1040 40 2	810 15 25		955 13 47	1030 140 2	87
	Females	Mean S.E.		780 36	830 90	925 95	863 15	992 49	921 9	1020	04
	Total	n Mean S.E. n	740 1	790 15 26	755 29 13	928 26 10	29 845 8 110	3 1019 43 5	50 936 6 196	1 1009 60 4	91 365
<u>Wrangell</u>	Males	Mean S.E. n			928 39 2		830 25 8		1040 19 16		26
	Females	Mean S.E. n			804 34 3		840 26 11		979 17 24	1001 1	39
	Total	Mean S.E. n			799 24 11		845 13 33		986 9 101	1001	146
<u>Sitka</u>	Males	Mean S.E. n		828 28 9		1010 28 4			1185 15 2		15
	Females	Mean S.E. n		835 17 23		915 14 5	812 13 2	960 1	1000 10 3	945 1	35
	Total	Mean S.E. n	700 32 4	831 5 221	760 11 14	952 10 71	888 12 45	970 10 2	984 33 13	1011 52 5	375

Appendix Table 20. Length at age in millimeters, by sex, for chinook salmon from select southeast Alaska sport fisheries, 1988 (continued).

						Brood	Year				
			1985	19	84	19	83	19	82	1981	
Sport Fishery			0.2	0.3	1.2	0.4	1.3	0.5	1.4	1.5	Sample Size
Juneau	Males	Mean	732	801	701	910	811		941	1070	
· · · · · · · · · · · · · · · · · · ·		S.E.	18	20	16	20	24		30	50	
		n	5	11	12	2	16		16	2	64
	Females	Mean	714	783	703	925	811		914		
		S.E.	12	11	19	27	10		16		
		n	4	20	11	10	37		27		109
	Total	Mean	718	792	705	931	812		932	1070	
		S.E.	11	9	10	18	8		12	50	
		n	11	46	42	16	75		60	2	252
Juneau	Males	Mean	712	859	705	845	820		862		
<u>Derby</u>		S.E.	42	27	33		23		72 2		33
		n	2	8	8	1	12		2		33
	Females	Mean	703	782	703	867	791		867		
		S.E.	2	10	11	8	11		16		
		n	3	27	10	2	25		4		71
	Total	Mean	703	802	706	860	795		866		
		S.E.	11	9	11	9	9		21		
		n	12	54	29	3	51		6		155
<u>Haines</u>	Males	Mean			740		817		1009	1105	
		S.E.			27		24		17	17	
		n			5		13		29	4	51
	Females				731		815		968	1033	
		S.E.			3		28		7	28	
		n			3		9		52	3	67
	Total	Mean			737		816		981	1070	
		S.E.			16		17		7	18	400
		n			8		23		90	8	129

Appendix Table 21. Numbers of coho salmon examined for coded-wire tags in southeast Alaska marine sport fisheries in 1988.

		Estimated Harvest	Number Sampled	Percent
Ketchikan	Non-derby 4/11-6/19	8	1	12
	Non-derby 6/20-7/31	511	39	
	Non-derby 8/1-9/25	4,991	542	1:
	Derby Take Home	14	2	14
	Total	5,525	584	1:
Petersburg	Non-derby 4/11-7/17	0	0	
	Derby Take Home	0	0	
	Total	. 0	0	
Wrangell	Non-derby 4/11-7/17	26	0	(
Sitka	Non-derby 4/11-6/19	0	0	
	Non-derby 6/20-7/31	68	5	
	Non-derby 8/1-9/25	549	52	
	Derby Take Home ³	0	0	
	Total	616	57	
Juneau				
Normal Dock	Non-derby 4/11-6/19	0	0	
Survey	Non-derby 6/20-7/31	1,541	210	1
	Non-derby 8/1-9/25	7,970	1,030	1
	Derby Entered ,	1,099	1,099	10
	Derby Take Home	354	66	1
	Total	10,963	2,405	2
Shelter Lodge	Non-derby 6/20-7/31	453	453	10
Survey	Non-derby 8/1-9/25	606	606	10
	Total	1,059	1,059	10
Both	Non-derby 4/11-6/19	0	0	
Normal Dock and	Non-derby 6/20-7/31	1,994	663	3
Shelter Lodge	Non-derby 8/1-9/25	8,576	1,636	1
Survey Combined	Derby Entered ,	1,099	1,099	10
	Derby Take Home	354	66	1
	Total	12,022	3,464	2
Haines	Non-derby 4/11-7/10	0	0	
	Derby Take Home	0	0	
	Total	0	0	
Grand Total		18,189	4,105	2

Derby held on weekends of 28-30 May, 4-5 June, and 11-12 June.

Derby held on 28-30 May weekend.

Derby held on weekends of 28-30 May and 4-5 June.

Derby held on 5-7 August weekend.

Derby held on weekends of 28-30 May and 4-5 June.

Appendix Table 22. Estimates of hatchery produced coho salmon contributed to the Ketchikan, Sitka, and Juneau marine sport fisheries from 11 April to 25 September 1988.

					Non-der	-by 4/:	1-9/25		Derby ¹	ı		Total	
Fishery	Region	Agency ²	Hatchery/ Release Site	Tag Code	Recov ³ (Contr ⁴	Var. of Contr ⁵	Recov ³	Contr ⁴	Var. of Contr ⁵	Recov ³	Contr ⁴	Var. of Contr ⁵
KETCHIKAN													
	Southeast Alaska	SSRAA	NAKAT INLET	04-26-42	1	64	4,106				1	64	4,106
	Alaska		WHITMAN LAKE	04-26-43	3	228	18,499				3	228	18,499
			Ketchika	n Total	4	292	22,605				4	292	22,605
SITKA													
	Southeast Alaska	SJ	SHELDON JACKSON	04-26-23 04-26-24 04-28-02 04-28-03 04-28-05 04-28-07 04-28-08	1 1 1 1 1 1 1	10 14 21 143 11 11 8	105 353 878 20,815 112 115 68				1 1 1 1 1 1	10 14 21 143 11 11	105 353 878 20,815 112 115 68
			Sitka	Total	7	218	22,447				7	218	22,447
JUNEAU								•					
	Southeast Alaska	ADF&G	SNETTISHAM	04-27-27 84-12-07	1 1	204 28	41,446 782				1	20 4 28	41,446 782
		DIPC	SHEEP CREEK	04-28-20	2	17	125	2	2	0	4	19	125
		NMFS	AUKE CREEK	03-20-23	1	8	54				1	8	54
		NSRAA	MEDVEJIE CIF	B4-12-00				1	3	7	1	3	7
			Juneau	[otal	5	257	42,407	3	5	7	8	262	42,414

¹ Derby held on 5-7 August weekend in Juneau.

²ADF&G = Alaska Department of Fish and Game
NMFS = National Marine Fisheries Service
SJ = Sheldon Jackson College
DIPC = Douglas Island Pink and Chum
NSRAA = Northern Southeast Regional Aquaculture Association
SSRAA = Southern Southeast Regional Aquaculture Association

Recov = Number of fish recovered of noted tag code.

⁴ Contr = Estimated harvest of the release of the noted tag code.

⁵ Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix Table 23. Estimates of the number of recoveries of wild coded-wire tagged coho salmon contributed to the Ketchikan, Sitka, and Juneau marine sport fisheries from 11 April to 25 September 1988.

				Non-d	erby 6/2	20-9/25		Derby	l		Total	
Fishery	2 Agency	Release Site	Tag Code	Recov		Var. of Contr	Recov ³	Contr ⁴	Var. of Contr	Recov ³	Contr ⁴	Var. of Contr
KETCHIKAN	ADF&G	MCDONALD LAKE	04-24-56 04-26-48	1	15 7	271 50				1	15 7	271 50
SITKA	ADF&G	SALMON LAKE	04-27-01	2	18	164				2	18	164
JUNEAU	CDFO	Various	02-43-40 02-43-41 02-43-42 02-43-48	1 1 1	16 8 8	246 51 64	1	1 		1 1 1 1	16 8 1 8	246 51 64
	NMFS	AUKE CREEK	03-20-25	6	44	265	3	7	24	9	51	289
	ADF&G	NAHLIN RIVER B.C.	04-24-59	2	10	75	1	1		,3	11	75
		TATSAMENIE L. B.C.	04-25-49				1	1		1	1	
		YEHRING CREEK	04-27-09	3	21	127	1	1		4	22	127
All Fishe	 ries	Grand 1	otal	18	147	1,313	7	11	24	25	158	1,337

Derby held on 5-7 August weekend.

² ADF&G = Alaska Department of Fish and Game CDFO = Canadian Department of Fisheries and Oceans

NMFS = National Marine Fisheries Service

Recov = Number of fish sampled of noted tag code

Contr = Estimated number of recoveries of the noted tag code, not corrected for tagging fraction.

⁵ Var. of Contr = Variance of estimated recoveries of the release of the noted tag code, not corrected for tagging fraction.

Appendix Table 24. Effort and harvest statistics for the Blind Slough terminal harvest area fishery by seasonal period from 13 June to 14 August 1988.

					Seasonal	Period				
	13JUN88 19JUN88	20JUN88 26JUN88	27JUN88 03JUL88	04JUL88 10JUL88	11JUL88 17JUL88	18JUL88 24JUL88	25JUL88 31JUL88	01AUG88 07AUG88	08AUG88 14AUG88	Total
Number of Samples	10	10	10	10	10	10	10	10	10	9
Number of Hours Sampled	38	38	38	38	38	38	38	38	38	33
Hours Available to Sample	105	105	105	105	105	105	105	105	105	94
Number of Anglers Counted	109	77	148	98	85	133	32	48	57	78
Number of Anglers Interviewed	109	77	148	98	85	133	32	48	57	78
Angler-days										
Estimate	261	183	460	260	282	393	87	122	151	2.20
Variance	197	88	232	101	456	108	54	19	48	1,30
Angler-hours										
Estimate	521	535	1,001	696	603	855	192	268	246	4,9
Variance	923	671	769	1,002	2,292	681	425	194	181	7,13
Large Chinook Salmon Kept							_		_	
Estimate	10	62	66	117	67	111	4	27	4	46
Variance	2	17	52	41	52	14	0	4	0	18
Large Chinook Salmon Released										_
Estimate	2	18	54	51	70	62	62	26	4	34
Variance	0	2	13	11	49	13	77	2	0	16
Small Chinook Salmon Kept							_	_	_	
Estimate	6	40	57	34	21	19	0	0	0	1
Variance	1	7	7	4	3	2	0	0	0	2
Small Chinook Salmon Released					_		_			
Estimate	8	13	45	44	24	34	0	0	0	16
Variance	2	1	6	8	6	3	0	0	0	
Coho Salmon Kept	_	_	_	_	_	_	_			
Estimate	0	0	0	0	0	0	o	30	30	(
Variance	0	0	0	0	0	0	0	4	18	:
Coho Salmon Released	_	_	_	_	_	_	_		_	
Estimate	Ō	0	0	0	0	0	0	0	0	
Variance	0	0	0	0	0	0	0	0	0	
Pink Salmon Kept		_	_	_	_	_		_	_	
Estimate	Ō	0	0	٠ ٥	0	0	. 0	0	8	
Variance	0	0	0	0	0	0	0	0	2	
Pink Salmon Released	_		_	_	_	_	_	_	_	
Estimate	0	0	0	0	0	0	0	0	0	
Variance d	0	0	0	0	0	0	0	0	0	
Chum Salmon Kept	_	_	_	_	_	_	_	_		
Estimate	0	0	0	0	0	0	0	2	0	
Variance	0	0	0	0	0	0	0	0	0	
Chum Salmon Released	_	_	_	_	_	_	_		~	
Estimate	0	0	0	0	0	0	4	38	2	4
Variance	0	0	0	0	0	0	0	39	0	3
Dolly Varden Kept		_		_	_	_	_	_		
Estimate	26	0	16	2	4	4	0	3	0	
Variance	17	0	3	0	0	0	0	0	0	2
Dolly Varden Released		_	_	_	_	_	_	_	_	_
Estimate	12	2	4	0	2	0	8	0	2	2
Variance	2	0	0	0	0	0	0	0	0	
Cutthroat Trout Kept		_	_	_	_	_	_		_	
Estimate	5	Ō	3	2	2	Ō	6	13	Q	3
Variance	0	0	0	0	0	0	0	2	0	
Cutthroat Trout Released									_	
Estimate	6	0	0	0	0	0	3	0	0	
Variance	0	0	0	0	0	0	0	0	0	

Appendix Table 25. Effort and harvest statistics for Juneau roadside sport fisheries by seasonal period and area during 1988.

					Samp	ling Peri	od						
	09MAY88 22MAY88	23MAY88 05JUN88	06JUN88 19JUN88	20JUN88 03JUL88	04JUL88 17JUL88	18JUL88 31JUL88	01AUG88 14AUG88	15AUG88 28AUG88	29AUG88 11SEP88	12SEP88 25SEP88	26SEP88 090CT88	100CT88 230CT88	Total
WIN LAKES FISHERY (5/09-10/23)													
Number of Count Samples	12	12	12	12	12	13							138
Mean Number of Anglers Counted	1		22	16	. 5				1				.64
Number of Interview Samples	12			12	12				11 28				138 336
Number of Possible Samples	28			28 60	28 19				20	20			23
Number of Anglers Interviewed	9	34	60	80	19	,	13	3	7	-	-	Ū	25
Angler-hours effort Estimate	40	408	1,483	757	270	99	404	49	51	18	. 8	0	3.587
Variance	70		30,002	18,063	1,723								68,418
Coho Salmon Kept	•	11,201	30,002	10,000	1,,20	01,	0,000						
Estimate	0	. 0	0	0	0	0	0	0	0	0	0	0	(
Variance	Ō	Ó	0	0	0	0	0	0	0	0	0	0	(
Coho Salmon Released													
Estimate	0			0	0								(
Variance	0	0	0	0	0	0	0	0	0	0	. 0	0	C
Pink Salmon Kept	_	_	_	_	_	_	•				•	•	,
Estimate	0			0					0				(
Variance_	O	0	0	0	0	0	0	0	0	U	U	U	,
Pink_Salmon Released	n	0	0	0	0	0	0	0	0	O	0	0	C
Estimate	ŭ												č
Variance	U	U	U	U	U	U	U	Ü	·	•	•	Ū	`
Chum Salmon Kept Estimate	0	0	0	0	0	0	0	0	O	0	. 0	0	C
Variance	Ö												č
Chum Salmon Released			Ū	Ū	•	·	·	·	•	_	-	•	•
Estimate	O	0	0	0	0	0	0	0	0	C	0	0	C
Variance	õ			ō	ō	Ö	ō	Ó	Ö	0	0	0	(
Dolly Varden Kept	_												
Estimate	0			0	0				0				5
Variance	0	0	0	0	0	0	0	0	. 0	0	. 0	0	(
Dolly Varden Released										_	_	_	
Estimate	Q	5		0	0								į
Variance	C	0	0	0	0	0	0	0	0	0	. 0	0	(
Cutthroat Trout Kept				-	•	0	0	0	8	0	17	a	55
Estimate	0				0								82
Variance	C	0	/55	U	U	U	U	U	U		03	U	02.5
Cutthroat Trout Released	c	0	19	49	0	0	0	0	0	0	. 0	0	67
Estimate Variance	Č			7.9	ő								189
Steelhead Kept			109	Ü		·	·	Ŭ	·	-	·	•	
Estimate	C	0	0	0	0	0	0	0	0	O	0	0	(
Variance	č								ŏ	Õ	· ō	Ō	Ċ
Steelhead Released		ŭ		•	•	_							
Estimate	C			0	0	0			0	0		0	(
Variance	č			Ō	Ō	0	0	0	0	0	0	0	C
Jack or Small Coho Salmon Kept													_
Estimate	9	139	955	1,370	141	123	244					0	3,398
Variance	C	2,255	37,580	279,065	0	0	21,979	3,758	1,774	2,916	1,111	0	350,438
Jack or Small Coho Salmon Released										_	_	_	0.00
Estimate	36			1,068		43				0			2,646
Variance	C	2,938	314,996	84,498	3,159	0	1,635	306	0	0	0	0	407,53

Appendix Table 25. Effort and harvest statistics for Juneau roadside sport fisheries by seasonal period and area during 1988 (Continued).

	s	ampling P	eriod	
	12SEP88 25SEP88	26SEP88 090CT88	100CT88 230CT88	Total
SALMON CREEK (9/12-10/23)				
Number of Count Samples	12	12		36
Mean Number of Anglers Counted	4	0		4
Number of Interview Samples	12	12		36
Number of Possible Samples	28	28		84
Number of Anglers Interviewed	12	0	0	12
Angler-hours effort		_	_	
Estimate	115	0	0	115
Variance	2,000	0	0	2,000
Coho Salmon Kept	0	0	0	0
Estimate	ŏ	ő		ŏ
Variance Coho Salmon Released	U	U	U	U
Estimate	0	0	0	0
Variance	ŏ	ő		0
Pink Salmon Kept	v	Ū	U	v
Estimate	143	0	0	143
Variance	2,235	ŏ		2,235
Pink Salmon Released	2,200	•	•	-,
Estimate	256	0	0	256
Variance	11,910	ō	Ŏ	11,910
Chum Salmon Kept	,			,
Estimate	0	0	0	0
Variance	0	0	0	0
Chum Salmon Released				
Estimate	0	0	0	0
Variance	0	0	0	0
Dolly Varden Kept				
Estimate	0	0	0	0
Variance	0	0	0	0
Dolly Varden Released	_	_	_	_
Estimate	0	0	0	0
Variance	0	0	0	0
Cutthroat Trout Kept Estimate	0	0	o	0
Variance	ŏ	ŏ		ŏ
Cutthroat Trout Released	U	U	U	Ū
Estimate	0	0	0	0
Variance	ŏ	ŏ	ŏ	ŏ
Steelhead Kept	•	·	•	•
Estimate	0	0	0	0
Variance	ŏ	ŏ	ŏ	ŏ
Steelhead Released	•	•	•	•
Estimate	0	0	0	0
Variance	Ō	Ó	Ō	Ö
Jack or Small Coho Salmon Kept				
Estimate	0	0	0	0
Variance	0	0	0	0
Jack or Small Coho Salmon Released				
Estimate	0	0	0	0
Variance	0	0	0	0

Appendix Table 25. Effort and harvest statistics for Juneau roadside sport fisheries by seasonal period and area during 1988 (Continued).

	S	ampling P	eriod	
	12SEP88 25SEP88	26SEP88 090CT88	100CT88 230CT88	Total
SHEEP CREEK (9/12-10/23)				
Number of Count Samples	12	12	12	3
Mean Number of Anglers Counted	0		. 1	_
Number of Interview Samples	12		12	3
Number of Possible Samples	28			8
Number of Anglers Interviewed	0	7	2	
Angler-hours effort				
Estimate	9	_73	23	10
Variance	20	707	0	72
Coho Salmon Kept			•	
Estimate		ō	0	
Variance		0	0	
Coho_Salmon Released		^	^	
Estimate		0	0	
Variance		0	U	
Pink Salmon Kept		0	0	
Estimate		ő	ŏ	
Variance Pink Salmon Released		U	U	
Estimate		0	0	
		ő	ŏ	
Variance Chum Salmon Kept		U	U	
Estimate		0	0	
Variance		ŏ	ŏ	
variance Chum Salmon Released		U	v	
Estimate		0	0	
Variance		ŏ		
Dolly Varden Kept		v	•	
Estimate		0	0	
Variance		ŏ	ŏ	
Dolly Varden Released		v	•	
Estimate		0	0	
Variance		ŏ		
Cutthroat Trout Kept		·	•	
Estimate		0	0	
Variance		ŏ		
Cutthroat Trout Released		·	•	
Estimate		0	0	
Variance		ŏ	ŏ	
Steelhead Kept		•	•	
Estimate		0	0	
Variance		ō	Ö	
Steelhead Released		_	-	
Estimate		0	0	
Variance		Ō	Ó	
Jack or Small Coho Salmon Kept				
Estimate		0	0	
Variance		0	0	
Jack or Small Coho Salmon Released				
Estimate		0		
Variance		Ó	Ó	

Appendix Table 25. Effort and harvest statistics for Juneau roadside sport fisheries by seasonal period and area during 1988 (Continued).

	S	ampling P	eriod	
	12SEP88 25SEP88	26SEP88 090CT88	100CT88 230CT88	Total
FISH CREEK (9/12-10/23)				
Number of Count Samples	12	12	12	36
Mean Number of Anglers Counted	1	0		_
Number of Interview Samples	12	12		30
Number of Possible Samples	28			84
Number of Anglers Interviewed	2	1	0	
Angler-hours effort			_	
Estimate	68	16	Ō	_8.
Variance	1,595	146	0	1,74
Coho Salmon Kept		_	_	
Estimate	0	Ó	Ō	(
Variance	0	0	0	(
Coho_Salmon Released			_	_
Estimate	Ō	_31	0	_3
Variance	0	586	0	58
Pink Salmon Kept		_	_	
Estimate	0	Ō		
Variance	0	0	0	(
Pink Salmon Released			_	
Estimate	Ō	Ō		
Variance	0	0	0	(
Chum Salmon Kept		_	_	
Estimate	0	Ō		
Variance	0	0	0	(
Chum Salmon Released		_	_	
Estimate	0	ō		
Variance	0	0	0	(
Dolly Varden Kept		_	_	_
Estimate	23	0		2.
Variance	304	0	0	30-
Dolly Varden Released		_	_	
Estimate	0	0		(
Variance	0	0	0	1
Cutthroat Trout Kept		_	_	
Estimate	Ō	ō		
Variance	0	0	0	(
Cutthroat Trout Released		_	_	
Estimate	0	0		
Variance	0	0	0	1
Steelhead Kept	_	_	_	
Estimate	0	0		
Variance	0	0	0	(
Steelhead Released				
Estimate	0	ó		(
Variance	0	0	0	(
Jack or Small Coho Salmon Kept				
Estimate	0	0		(
Variance	0	0	0	4
Jack or Small Coho Salmon Released				
Estimate	0	0	0	(
Variance	0	0	0	(

	S	ampling P	eriod	
	12SEP88 25SEP88	26SEP88 090CT88	100CT88 230CT88	Total
DREDGE LAKES (9/12-10/23)				
Number of Count Samples	12		12 5	36 12
Mean Number of Anglers Counted Number of Interview Samples	1 12			36
Number of Possible Samples	28			84
Number of Anglers Interviewed	2			36
Angler-hours effort				
Estimate	34	218	213	464
Variance	683	3,758	6,596	11,037
Coho_Salmon Kept	0	1.2	12	25
Estimate Variance	ů	13 25	0	25
Variance Coho Salmon Released	U	23	U	2.5
Estimate	0	107	12	119
Variance	õ	2,176	0	2,176
Pink Salmon Kept				
Estimate	0	0	Ō	0
Variance	0	0	0	0
Pink_Salmon Released	0	0	0	0
Estimate	0	0	ŏ	0
Variance Chum Salmon Kept	U	0	U	U
Estimate	0	0	0	0
Variance	ŏ	ŏ	ŏ	ō
Chum Salmon Released	-	_	-	
Estimate	0	0	0	0
Variance	0	0	0	0
Dolly Varden Kept	_	_		
Estimate	0	0	26	26 446
Variance	0	. 0	446	440
Dolly Varden Released Estimate	68	39	25	131
Variance	2,734	229	-0	2,962
Cutthroat Trout Kept	2,754	223	·	_,,,,,
Estimate	23	0	0	23
Variance	304	0	0	304
Cutthroat Trout Released				
Estimate	0	0	0	0
Variance	0	0	0	0
Steelhead Kept Estimate	0	0	0	0
Variance	Ö	ŏ	ŏ	ő
Steelhead Released	·	•	·	•
Estimate	0	0	0	0
Variance	ō	Ŏ	Ō	Ó
Jack or Small Coho Salmon Kept				
Estimate	Ō	82	12	94
Variance	0	2,651	0	2,651
Jack or Small Coho Salmon Released	_	_	7	-
Estimate	0	0	7 31	7 31
Variance	U	U	31	31

Appendix Table 26. Effort and harvest statistics for Haines roadside sport fisheries by seasonal period and area during 1988.

		Seasonal Period										
LUTAK INLET	20JUN88 03JUL88	04JUL88 17JUL88					12SEP88 25SEP88	26SEP88 09OCT88	100CT88 230CT88	240CT88 06NOV88	Total	
Number of Count Samples	9	9	9	9	9	9	11	14	14	14	107	
Mean Number of Anglers Counted	1	0	6	14	8	5	.0	.0	0	.0	35	
Number of Interview Samples	9 56	9 56	9 56	9 56	9 56	9 56	11 56	14 42	14 42	14 42	107 518	
lumber of Possible Samples lumber of Anglers Interviewed	3	2	25	66	41	22	2	42	42	70	161	
Angler-hours	•	-		••			-	ū	•	•		
Estimate	68	17	545	1,333	840	481	9	0	0	0	3,293	
Variance	1,842	217	31,853 1	36,042	111,994	76,600	54	0	0	0	358,603	
Coho Salmon Kept	_	_	•	_	•	•	•				^	
Estimate	0	0	0	0	0	0	0				0	
Variance Coho Salmon Released	U	U	U	U	U	U	U				v	
Estimate	0	0	0	0	0	0	0				0	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ				Ġ	
Pink Salmon Kept												
Estimate	0	o	79	493	682	260	22				1,537	
Variance	0	0	2,661	81,056	79,618	27,577	390				191,304	
Pink Salmon Released Estimate	0	0	29	0	310	651	37				1,027	
Variance	0		18,168	ŏ		243,438	1,085				288,950	
ockeye Salmon Kept	•	•	10,100	·	20,200	210,100	1,000					
Estimate	0	0	0	0	0	0	0				0	
Variance	0	0	0	0	0	0	0				C	
ockeye Salmon Released		_	_	_	_	_	_				_	
Estimate	0	0	0	0	0	0	0				0	
Variance	0	0	0	0	0	0	0				u	
hum Salmon Kept Estimate	0	0	0	0	0	0	0				O	
Variance	ñ	ŏ	ŏ	ŏ	ŏ	ň	ŏ				ŏ	
hum Salmon Released	-	_	_	_	_	-	-					
Estimate	0	0	0	0	0	0	0				0	
Variance	0	0	0	0	0	0	0				0	
olly Varden Kept	•		10	24	•	•	0				48	
Estimate	0	4 17	10 35	34 795	0	0	Ö		·		846	
Variance Olly Varden Released	U	1/	35	795	U	U	U				040	
Estimate	37	8	29	31	17	0	0				122	
Variance	940	53	3,042	1,374	218	Ō	Ō				5,628	
utthroat Kept				•								
Estimate	0	Ō	10	0	0	0	ō				10	
Variance	0	0	148	0	0	0	0				148	
cutthroat Released	0	0	0	0	0	0	0				O	
Estimate Variance	Ö	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ				ŏ	
teelhead Kept	•	•	-	•	•	•	•				_	
Estimate	0	0	0	0	0	0	0				0	
Variance	0	0	0	0	0	0	0				0	
teelhead Released	•	•	•			0	0				C	
Estimate	0	0	0	0	0	0	0				0	
Variance mall Coho Salmon Kept	U	U	U	U	U	U	U				·	
maii Cono Salmon Rept Estimate	0	0	0	0	0	0	0				o	
Variance	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ				ŏ	
mall Coho Salmon Released	-	-	-	•	_	-	-					
Estimate	0	0	0	0	0	o	0				Q	
Variance	0	0	0	0	0	0	0				0	

Appendix Table 26. Effort and harvest statistics for Haines roadside sport fisheries by seasonal period and area during 1988 (continued).

					Seas	onal Peri	od				
CHILKOOT RIVER BELOW WEIR	20JUN88 03JUL88	04JUL88 17JUL88	18JUL88 31JUL88	01AUG88 14AUG88	15AUG88 28AUG88	29AUG88 11SEP88	12SEP88 25SEP88	26SEP88 090CT88	100CT88 230CT88	240CT88 06NOV88	Total
Number of Count Samples	9	.9	9 19	9 31	9 37	9 20	11	14 18	14	14	107 167
Mean Number of Anglers Counted Number of Interview Samples	18 9	12 9	9	9	9	9	11	14	14	14	107
Number of Possible Samples	56	56	56	56	56	56	56	42	42	42	518
Number of Anglers Interviewed	98	72	83	187	148	67	41	101	27	1	825
Angler-hours	1,828	1,547	1,980	3,069	3,540	1,823	849	1,237	237	13	16,122
Estimate Variance	272,346	64,592	69,764	135,441	370,069	186,334	26,171	25,879	2,013	27	1,152,636
Coho Salmon Kept	·	-								_	
Estimate	0	0	0	0	0	0	23 184	152 2,642	42 532	0	217 3,358
Variance	0	0	0	U	U	U	104	2,042	532	U	3,350
Coho Salmon Released Estimate	0	0	0	0	0	0	0	4	3	5	12
Variance	0	0	0	0	0	0	0	8	4	4	16
Pink Salmon Kept	0	6	39	693	1,513	995	319	8	0	0	3,574
Estimate Variance	ŏ	12	187	53,651	259,322	200,711	28,291	22	ŏ	ŏ	542,194
Pink Salmon Released	· ·	•		· ·			·				
Estimate	0	0	0	389	1,744	2,491	3,313	1,144	3 2	0	9,084
Variance	0	0	0	97,195	335,616	1619723	2945870	231,965	2	U	5,230,371
Sockeye Salmon Kept Estimate	170	12	39	106	257	14	0	0	0	0	598
Variance	95,822	88	1,377	1,289	23,910	63	0	0	0	0	122,549
Sockeye Salmon Released	-		0	4	n	0	0	0	0	0	12
Estimate Variance	7 140	0	Ö	23	0	ŏ	0	ŏ	ŏ	ŏ	163
Chum Salmon Kept	140	ŭ	· ·		_		-	_	-	-	
Estimate	Ó	o	0	0	0	0	0	4	0	0	4
Variance	0	0	0	0	0	0	0	4	0	0	4
Chum Salmon Released Estimate	0	0	0	0	7	0	0	0	0	0	7
Variance	ŏ	ŏ	ŏ	ŏ	44	ō	Ō	0	Ó	ο	44
Dolly Varden Kept				200	200		20	8	3	0	1,530
Estimate	107 3,272	236 8,289	322 9,095	398 21,051	390 65,076	28 250	38 989	45	3	ŏ	108,069
Variance Dolly Varden Released	3,2/2	0,209	9,093	21,031	03,070	250	505		-		
Estimate	27	292	67	213	123	0	Ó	55	0	0	776
Variance	607	12,749	1,472	14.035	4,946	0	0	1,875	0	0	35,684
Cutthroat Kept Estimate	0	0	0	0	0	0	0	0	0	0	O
Variance	ŏ	Ö	ŏ	Ō	Ö	Ō	Ó	0	0	0	0
Cutthroat Released			•		^		0	0	0	0	O
Estimate	0	0	0	0	0	0	0	0	Ö	ŏ	0
Variance Steelhead Kept	U	Ū	Ū	U	ŭ	_	-	•	_	-	_
Estimate	0	0	0	0	0	0	0	Ō	Ō	0	Q
Variance	0	0	0	0	0	0	0	0	0	0	O
Steelhead Released Estimate	0	0	0	0	0	0	0	0	0	0	O
Variance	ő	ő	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ō
Small Coho Salmon Kept	_	-	_	_	_	_	_	_	_	_	_
Estimate	0	0	0	0	0	0	0	0	0	0	0
Variance Small Coho Salmon Released	U	U	U	U	U	U	U	U	Ū	Ü	v
Estimate	0	0	0	0	0	0	o.	4	0	o	4
Variance	0	0	0	0	0	0	0	8	0	0	8

Appendix Table 26. Effort and harvest statistics for Haines roadside sport fisheries by seasonal period and area during 1988 (continued).

					Seas	onal Peri	od				
CHILKOOT RIVER ABOVE WEIR	20JUN88 03JUL88	04JUL88 17JUL88	18JUL88 31JUL88	01AUG88 14AUG88	15AUG88 28AUG88	29AUG88 11SEP88	12SEP88 25SEP88	26SEP88 09OCT88	100CT88 230CT88	240CT88 06NOV88	Total
Number of Count Samples	9										107 63
Mean Number of Anglers Counted Number of Interview Samples	5										107
Number of Interview Samples	56										518
Number of Anglers Interviewed	24					26	18	84	. 7	0	323
Angler-hours										_	
Estimate	493										6,511 365,540
Variance Coho Salmon Kept	38,148	/5,863	/2,140	45,107	20,000	17,674	0,070	70,393	2,523	U	305,540
Estimate	0	0	0	0	0	. 0	5	172	. 0		178
Variance	ō					. 0	11	3,734	. 0		3,744
Coho Salmon Released		_	_	_	_		_	_			
Estimate	0										54 1,717
Variance Pink Salmon Kept	U	U	U	U	U		U	U	1,/1/		1,/1/
Estimate	0	0	10	6	0	. 0	0	0	. 0		16
Variance	ō				Ö	· O	0	Ó	Ó		329
Pink Salmon Released	_	_	_	_	_			_			
Estimate	0							0			91 2,071
Variance Sockeye Salmon Kept	U	·	U	U	U	091	1,300	U			2,071
Estimate	0	0	0	0	11	0	0	0	. 0		11
Variance	ō	0	0	Ó	52	. 0	0	0	. 0		52
Sockeye Salmon Released	_	_	_	_	_						
Estimate	0										C
Variance Chum Salmon Kept	0	0	0	0	U		U	U	·		
Estimate	0	0	0	0	0	. 0	0	0	. 0		C
Variance	Ö				Ō	0	0	Ó	Ó		Ċ
Chum Salmon Released				_	_	_	_	_	_		
Estimate	0										C
Variance Dolly Varden Kept	0	0	U	U	U	u	U	U	·		,
Estimate	63	221	955	757	959	631	249	215	248		4,299
Variance	1,609				397,629				28,324		823,270
Dolly Varden Released									_		
Estimate	0				128						829 70,654
Variance Cutthroat Kept	U	0	U	1,3/0	5,051	56,013	7,964	212	. 30		70,054
Estimate	0	0	0	. 0	0	. 0	0	5	0		5
Variance	ō					. 0	0	10	Ó		10
Cutthroat Released			_	_	_	_	_	_	_		
Estimate	0										C
Variance	0	Ō	0	0	U	U	U	U	·		· ·
Steelhead Kept Estimate	0	0	0	٥	0	. 0	0	0	0		C
Variance	ō			ō	ō	Ō	Ō	0	0		0
Steelhead Released			_	_	_	_	_	_	_		_
Estimate	0										0
Variance	0	0	0	0	0	0	0	0	0		ū
Small Coho Salmon Kept Estimate	0	0	0	0	0	. 0	0	4			4
Variance	Ö										Ē
Small Coho Salmon Released	•	v		_	•	-					
Estimate	0										0
Variance	0	. 0	0	0	0	0	0	0	0		0

Appendix Table 26. Effort and harvest statistics for Haines roadside sport fisheries by seasonal period and area during 1988 (continued).

		Seasonal	Period		
CHILKAT RIVER (EXCEPT KELSALL LANDING)		26SEP88 090CT88		240CT88 06NOV88	Total
Number of Count Samples	11		14		53
Mean Number of Anglers Counted	3 11		14 14		41 53
Number of Interview Samples Number of Possible Samples	56		42		182
Number of Anglers Interviewed	16		114		271
Angler-hours					
Estimate	215		1,178		2,970
Variance	5,804	87,309	78,513	294	171,919
Coho Salmon Kept	o	131	55	9	195
Estimate Variance	ő		1,817		3,762
Coho Salmon Released	v	1,522	1,01/		0,702
Estimate	0		0		22
Variance	0	278	0	0	278
Pink Salmon Kept				•	•
Estimate	0		0		0
Variance Pink Salmon Released	U	·	·	U	•
Estimate	0	0	0	0	0
Variance	0	0	0	0	0
Sockeye Salmon Kept	_	_	_	_	
Estimate	0		0		0
Variance	0	0	U	U	U
Sockeye Salmon Released Estimate	0	0	0	0	0
Variance	ŏ		ŏ		ŏ
Chum Salmon Kept					
Estimate	Ō		225		590
Variance	0	25,521	5,616	0	31,137
Chum Salmon Released	8	455	113	2	578
Estimate Variance	16		2,381		36,970
Dolly Varden Kept		,	-,		
Estimate	17		3		54
Variance	131	868	1	0	1,001
Dolly Varden Released	8	36	6	3	53
Estimate Variance	16				621
Cutthroat Kept	10		.,		
Estimate	0		3		11
Variance	0	10	1	0	11
Cutthroat Released	0	. 0	0	o	0
Estimate	0		0		Ö
Variance Steelhead Kept	U		U	U	v
Estimate	0	0	0	0	0
Variance	0	0	0	0	0
Steelhead Released			•	•	•
Estimate	0		0		0
Variance Small Coho Salmon Kept	U	·	U	U	U
Estimate Estimate	0	0	3	0	3
Variance	ŏ		ĭ		ī
Small Coho Salmon Released	_				
Estimate	0		0		0
Variance	0	0	0	0	0

Appendix Table 26. Effort and harvest statistics for Haines roadside sport fisheries by seasonal period and area during 1988 (continued).

		Seasonal	Period		
CHILKAT RIVER (KELSALL LANDING)		26SEP88 090CT88			Total
Number of Count Samples	4	7	7	8	26
Mean Number of Anglers Counted	6				10
Number of Interview Samples	4 56				26 182
Number of Possible Samples	12				25
Number of Anglers Interviewed Angler-hours	14	,	3	•	23
Estimate	434	91	54	138	717
Variance	48,559		2,268	3,129	54,670
Coho Salmon Kept	,		-,		•
Estimate	140				324
Variance	25,489	2,484	4,032	1,675	33,680
Coho Salmon Released		_	_		
Estimate	35				95
Variance	495	0	0	4,679	5,174
Pink Salmon Kept	0	0	0	0	0
Estimate Variance	0				0
Pink Salmon Released	V	U	Ū	v	Ū
Estimate	0	0	0	0	0
Variance	ŏ				Ō
Sockeye Salmon Kept					
Estimate	0				0
Variance	0	0	0	0	0
Sockeye Salmon Released	_	_	_	_	_
Estimate	0				0
Variance	0	0	0	0	0
Chum Salmon Kept	0	0	٥	0	0
Estimate Variance	Ö				ŏ
variance Chum Salmon Released	U	Ū	Ü	U	U
Estimate	0	0	0	0	0
Variance	ŏ				Ō
Dolly Varden Kept	•	•			
Estimate	85	0	0	0	85
Variance	6,372	0	0	0	6,372
Dolly Varden Released	_	_	_	_	_
Estimate	0				0
Variance	0	0	0	0	0
Cutthroat Kept	0	0	0	0	0
Estimate Variance	0				ő
Cutthroat Released	· ·	Ū	J	v	v
Estimate	0	0	0	0	0
Variance	ō			Õ	Ö
Steelhead Kept					
Estimate	0				0
Variance	0	0	0	0	0
Steelhead Released	_	_	_	_	_
Estimate	0				0
Variance	0	0	0	0	0
Small Coho Salmon Kept	0	0	0	0	0
Estimate Variance	0				ŏ
variance Small Coho Salmon Released	U	U	U	U	U
Estimate	0	0	0	0	0
	ŏ				ŏ

Appendix Table 27. Effort and harvest statistics for Yakutat roadside sport fisheries by seasonal period and area during 1988.

						Sea	sonal Per	iod							
	28MAR88 10APR88	11APR88 24APR88	25APR88 08MAY88		23MAY88 05JUN88	06JUN88 19JUN88		04JUL88 17JUL88	18JUL88 31JUL88	01AUG88 14AUG88	15AUG88 28AUG88		12SEP88 25SEP88	26SEP88 090CT88	Total
SITUK RIVER - LOWER LANDING															
Number of Samples Number of Hours Sampled	11 39	10 37	8 32	8 32	5 25	12 48	14 56	8 32	11 43	8 30	9 36	12 46	9 40	10 40	135 533
Hours Available to Sample	196	210	224	238	252	252	224	224	224	210	224	210	189	168	3,045
Number of Anglers Counted	17	28	41	12	8	11	64	11	33	20	61	76	14	2	398
Number of Anglers Interviewed	17	28	41	12	8	11	64	11	33	20	61	76	14	2	398
Angler-days Estimate	227	591	1.050	226	74	106	547	150	399	421	954	1,081	474	25	6,324
Variance Angler-hours	6,402	82,649	217,169	11,060	1,738	844	3,021	2,648	10,659	13,982	40,889	28,985	25,692	269	446,006
Estimate Variance	875 185,144	4,084 5,471,478	5,049 4,435,251	1,128 295,680	246 9,524	278 7,012	2,477 108,924	521 34,431	1,194 80,971	1,095 71,566 1	4,196 ,110,717	3,744 326,662	2,342 989,448	80 1,680	27,308 13,128,487
Steelhead Kept Estimate Variance	28 411	85 1,568	182 7,294	36 825	43 275	0	6 26	0	0	0	0	0	0	0	379 10,398
Steelhead Released Estimate Variance	157	2,536 2,638,219	1,216 456,474	651 315,967	98 2.752	0	3 7	0	0	0	0	0	0	0	4,660 3,421,288
Chinook Salmon >16" Kept Estimate	0	0 0	0	0	0	4 12	99 1,452	25 352	0	0	14 162	0	0	0	142
Variance Chinook Salmon >16" Released Estimate	0	0	0	0	0	0	54	30	40	0	0	0	0	0	124
Variance Chinook Salmon <16" Kept Estimate	0	0	0	0	0	0	2,093 3	365 0	695 0	0	0	0	0	0	3,153
Variance Chinook Salmon <16" Released	Ŏ O	ō O	0	0	0	0	7 6	0	0	0 6	0	0	0	0	7 12
Estimate Variance Sockeye Salmon Kept	ŏ	ŏ	Ŏ	ō	Ó	0	11	Ó	Ó	27	0	0	0	ō	38
Estimate Variance Sockeye Salmon Released	0	0	0	0	0	24 284	638 23,393	139 3,967	172 4,370	6 27	0	0	0	0	979 32,041
Estimate Variance Pink Salmon Kept	0 0	0	0	0	0	8 46	149 2,629	182 14,247	65 1,558	0	0	0	0	0	404 18,480
Estimate Variance	0	0	0	0	0	0 0	9 59	0	85 1,468	428 7,144	621 44,393	69 681	0	0 0	1,212 53,746
Pink Salmon Released Estimate Variance	0	0	0	0	0	0	0	0	118 3,580	522 51,365	1,356 76,525	145 3,324	5 23	0	2,146 134,817
Coho Salmon Kept Estimate Variance	0	0	0	0	0	0	0	0	0	61 440	541 33,732	911 23,625	349 19,436	25 269	1,886 77,501
Coho Salmon Released Estimate	0	0	0	0	0	0	0	0	0	34 956	33 148	176 3,323	388 140,178	0	631 144,604
Variance Dolly Varden Kept Estimate	0	0	0	12	191	4	3	34	209	79	19	33	5	4	594
Variance Dolly Varden Released	0	0	0 32	118 643	10,775 184	12 12	7 96	271 131	4,550 188	2,880 11	72 38	185 24	23 0	67 0	18,959 1,360
Estimate Variance Rainbow Trout Kept	0	ő	307	284,629	29,840	51	2,603	6,336	12,782	106	848	119	ō	ō	337,620
Estimate Variance	0	0	0	0	0	0	9 32	0 0	0	0 0	0 0	0	0	0	9 32
Rainbow Trout Released Estimate Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table 27. Effort and harvest statistics for Yakutat roadside sport fisheries by seasonal period and area during 1988 (Continued).

					Seasona)	Period					
	28MAR88 10APR88	11APR88 24APR88	25APR88 08MAY88	09MAY88 22MAY88	23MAY88 05JUN88	06JUN88 19JUN88	20JUN88 03JUL88	04JUL88 17JUL88	18JUL88 31JUL88	01AUG88 14AUG88	Tota1
SITUK RIVER - NINE MILE BRIDGE											
Number of Samples	1 4	2	4 15	4 16	6 24			4 16		4 14	36 139
Number of Hours Sampled Hours Available to Sample	98	105	224	238	252	252	112	224	224	210	1,939
Number of Anglers Counted	1	4	11 11	4							30 30
Number of Anglers Interviewed Angler-days	•	7	**		-	_	-				
Estimate	28	87	338	119	0			90 832			898
Variance Angler-hours	0	7,038	28,428	0	Ų	U	2,929	632	3,770	5,119	48,117
Estimate	56	181	1,056	320				209			2,763
Variance Steelhead Kept	0	30,547	223,861	8,720	0	0	354,414	0	4.354	23,019	644,915
Estimate	0	14	29	0	0	0		0			44
Variance	0	195	404	0	0	0	0	0	0	0	599
Steelhead Released Estimate	0	29	263	30	0	0	10	0	0	0	331
Variance	ŏ		10,119	826				ŏ			11,808
Chinook Salmon >16" Kept	0	0	0	0	0	. 0	29	0	0	14	43
Estimate Variance	ŏ			ŏ							928
Chinook Salmon >16" Released	_	_	_	_	_		_				•
Estimate Variance	0	0	0	0				0			0
Chinook Salmon <16" Kept	-	-				_	_	•	•		
Estimate	0	0	0	0				0			0
Variance Chinook Salmon <16" Released	0	U	U	U	U	U	U	U	·	U	U
Estimate	0	0	0	0				ō			19
Variance	0	0	0	0	0	0	325	0	0	0	325
Sockeye Salmon Kept Estimate	0	0	0	0	0			60			203
Variance	0	0	0	0	0	0	18,307	0	0	0	18,307
Sockeye Salmon Released Estimate	0	0	0	0	0	0	0	0	0	. 0	0
Variance	ŏ			ŏ							ō
Pink Salmon Kept		^	0	0	0	0	0	0	0	0	0
Estimate Variance	0	0		0				0			0
Pink Salmon Released	-	_				-	-	_			_
Estimate	Ŏ	0	0	0				0			0
Variance Coho Salmon Kept	0	U	. 0	U	U	U	U	U	U	U	Ū
Estimate	0	o	Ó	Ō				0			0
Variance	0	0	0	0	0	0	0	0	0	0	0
Coho Salmon Released Estimate	0	0	0	0	0	0	0	0	0	0	0
Variance	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden Kept Estimate	0	0	0	208	0	0	0	0	0	300	508
Variance	ŏ		ŏ	20,639				ŏ			104,639
Dolly Varden Released	_	_				_	^-	_	_		647
Estimate Variance	0		147 10,637	104 5,160				0			647 107,933
Rainbow Trout Kept	_	_						_		•	
Estimate	0	0	0	0	0	0		0			0
Variance Rainbow Trout Released	0	0	U	U	U	U	υ	U	U	U	U
Estimate	o	0	14	0				0			14
Variance	0	0	195	0	0	0	0	0	0	0	195

Appendix Table 27. Effort and harvest statistics for Yakutat roadside sport fisheries by seasonal period and area during 1988 (Continued).

			Seasonal	Period	
	15AUG88 28AUG88	29AUG88 11SEP88	12SEP88 25SEP88	26SEP88 090CT88	Total
OST RIVER - TAWAH CREEK					
Number of Samples	6 24	12 46	9 40	10 40	3 14
Number of Hours Sampled Hours Available to Sample	112	210	189	168	67
Number of Anglers Counted	11	55	52	12	13
Number of Anglers Interviewed	11	55	52	12	13
Angler-days					
Estimate	129	797	871	206	2,00
Variance	795	26,233	20,341	2,334	49,70
Angler-hours Estimate	347	2,597	3,546	884	7,37
Variance	8,948	570,295	463,988	200,611	1,243,84
Steelhead Kept	•	•	-		
Estimate	Ō	Ó	Ō	ō	
Variance	0	0	0	0	
Steelhead Released	•	0	0	0	
Estimate Variance	0	0	0	ő	
Variance Chinook Salmon >16" Kept	·	J	Ū	Ŭ	
Estimate	0	0	0	0	
Variance	Ō	Ó	0	0	
Chinook Salmon >16" Released					
Estimate	0	ō	0	0	
Variance	0	0	0	0	
Chinook Salmon <16" Kept Estimate	0	4	0	0	
Variance	0	11	ŏ	ő	1
Chinook Salmon <16" Released	·		•	•	
Estimate	0	0	0	0	
Variance	0	0	0	0	
Sockeye Salmon Kept		_	_	•	
Estimate	0	0	0	0	
Variance Sockeye Salmon Released	U	U	U	U	
Estimate	0	0	0	0	
Variance	ŏ	ŏ	ŏ	ŏ	
Pink Salmon Kept					
Estimate	38	.5	0	0	-4
Variance	464	61	0	0	52
Pink Salmon Released Estimate	14	32	10	0	5
Variance	194	650		ŏ	9
Coho Salmon Kept					
Estimate	52	830		181	1,80
Variance	1,208	61,608	13,658	1,635	78,10
Coho Salmon Released	•	100	100	21	24
Estimate	0	128 3,021	120 813	21 560	26 4,39
Variance Dolly Varden Kept	U	3,021	013	300	4,55
Estimate	14	0	0	0	1
Variance	194	ō		ŏ	19
Dolly Varden Released				_	
Estimate	14	0	19	0	3
Variance	194	0	127	0	32
Rainbow Trout Kept	5	0	0	0	
Estimate Variance	22	0	ő	0	2
Rainbow Trout Released	22	Ū	Ū	·	-
Estimate	0	0	0	0	
Variance	0	0	0	0	

	15AUG88	Seasonal Period									
	28AUG88	29AUG88 11SEP88	12SEP88 25SEP88	26SEP88 09OCT88	Total						
NKAU LAGOON											
Number of Samples	5 47	6 30	5 13	5 5	2						
Number of Hours Sampled Hours Available to Sample	4/ 5	6	5	5	2						
Number of Anglers Counted	112	112	42	42	30						
Number of Anglers Interviewed	85	108		19	25						
Angler-hours											
Estimate	5,236	3,098		773	11,52						
Variance	212,333	1706283	898,111	197,917	3,014,64						
Steelhead Kept		_	_	_							
Estimate	0	0	0	0							
Variance	0	0	U	U							
Steelhead Released Estimate	0	0	0	0							
Variance	ŏ		0	ő							
Chinook Salmon >16" Kept	ŭ	·	•								
Estimate	0	0		0							
Variance	ō	0	0	0							
Chinook Salmon >16" Released	_		_	_							
Estimate	0										
Variance	0	0	0	0							
Chinook Salmon <16" Kept	0	0	0	0							
Estimate	Ö										
Variance Chinook Salmon <16" Released	U	U	·	v							
Estimate	0	0	0	0							
Variance	ŏ			ŏ							
Sockeye Salmon Kept											
Estimate	0										
Variance	0	0	0	0							
Sockeye Salmon Released	_	_		_							
Estimate	0										
Variance	0	0	0	0							
Pink Salmon Kept	0	0	0	0							
Estimate Variance	ŏ										
Pink Salmon Released	v	·	Ū	Ū							
Estimate	0	22			2						
Variance	Ó	281	0	0	28						
Coho Salmon Kept		_									
Estimate	667	694		260	2,42						
Variance	10,981	154,736	148,083	26,104	339,90						
Coho Salmon Released	27	150	240	0	53						
Estimate	37 298	150 8,191	349 104,385		112,87						
Variance Dolly Varden Kept	290	0,191	104,303	U	112,07						
Estimate	0	0	0	0							
Variance	ŏ										
Dolly Varden Released	J	·	•	_							
Estimate	0										
Variance	0	0	0	0							
Rainbow Trout Kept		_	_	_							
Estimate	0										
Variance	0	0	0	0							
Rainbow Trout Released	0	0	0	0							
Estimate Variance	0										